Clark University
in the City of Worcester
Massachusetts

Register and
Twenty-ninth Official
Announcement

1917

CLARK UNIVERSITY

WORCESTER, MASSACHUSETTS

REGISTER AND TWENTY-NINTH OFFICIAL ANNOUNCEMENT

WORCESTER, MASSACHUSETTS
Published for the University
February, 1917

BOARD OF TRUSTEES

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COMMITTEES

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A. George Bullock
Arthur F. Estabrook
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Buildings

Orlando W. Norcross

CALENDAR 1917–1918

1917			
FEB.	1	Thursday	Founder's Day*
FEB.	22	Thursday	Washington's Birthday
APRIL	2	Monday	Spring Recess
APRIL	7	Saturday	
APRIL	19	Thursday	Patriots' Day
MAY	30	Wednesday	Memorial Day
JUNE	21	Thursday	Twenty-eighth academic year closes

Summer Vacation of 14 Weeks

SEPT.	27	Thursday	Twenty-ninth academic year begins
OCT.	12	Friday	Columbus Day
NOV.	29	Thursday	Thanksgiving Day
DEC.	22	Saturday	Christmas Recess
1918			
JAN.	2	Wednesday	
FEB.	1	Friday	Founder's Day*
FEB.	22	Friday	Washington's Birthday
APRIL	1	Monday	Spring Recess
APRIL	6	Saturday	
APRIL	19	Friday	Patriots' Day
MAY	30	Thursday	Memorial Day
JUNE	20	Thursday	Twenty-ninth academic year closes

* Not a holiday

MEMBERS

UNIVERSITY SENATE

Granville Stanley Hall, Ph.D., LL.D. 156 Woodland St.
President of the University and Professor of Psychology

A.B., Williams College, 1867; A.M., 1870; Ph.D., Harvard University, 1878; Lecturer in Harvard and Williams Colleges, 1880–81; Professor of Psychology, Johns Hopkins University, 1881–88; President and Professor of Psychology, Clark University, 1888–; LL.D., University of Michigan, 1888, Williams College, 1889, and Johns Hopkins University, 1902; Chairman of the Library Committee and Curator of the Art Collection, Clark University. Member of the National Academy of Sciences; Resident Member of the Massachusetts Historical Society.

William Edward Story, Ph.D. 17 Hammond St.
Professor of Mathematics and Secretary of the Faculty

A.B., Harvard University, 1871; Ph.D., University of Leipzig, 1875; Parker Fellow (Harvard), 1874–75; Tutor of Mathematics, Harvard University, 1875–76; Associate, Assistant Professor, and Associate Professor of Mathematics, Johns Hopkins University, 1876–89; Professor of Mathematics, Clark University, 1889–; Professor of Mathematics, Clark College, 1902–07. Member of the National Academy of Sciences; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

Edmund Clark Sanford, Ph.D., Sc.D., LL.D.
Lecturer on College Administration 160 Woodland St.

A.B., University of California, 1883; Fellow, Johns Hopkins University, 1887; Ph.D., Johns Hopkins University, 1888; Instructor in Psychology, Johns Hopkins University, 1888; Instructor in Psychology, Clark University, 1889-92; Assistant Professor 1892–1900; Professor of Psychology, Clark College, 1903–07; Professor of Experimental and Comparative Psychology, Clark University, 1900–09; Lecturer on College Administration, 1909–; Sc.D , Hobart College, 1909; President of Clark College, 1909–; LL.D., University of California, 1912.

Arthur Gordon Webster, Ph.D., Sc.D., LL.D.
Professor of Physics 66 West St.

A.B., Harvard University, 1885; Instructor in Mathematics, Harvard University, 1885–86; Parker Fellow, 1886–89; Student, Universities of Berlin, Paris, Stockholm, 1886–90; Ph.D., University of Berlin, 1890; Docent in Physics, Clark University, 1890–

92; Assistant Professor, 1892–1900; Professor, 1900–; Professor of Physics, Clark College, 1902–07; Director of Physical Laboratories; Sc.D., Tufts College, 1905; LL.D., Hobart College, 1908. Member of the National Academy of Sciences; Resident Fellow of the American Academy of Arts and Sciences; Member of the American Philosophical Society.

HENRY TABER, PH.D.
Professor of Mathematics 26 Dayton St.

Ph.B., Yale University, 1882; Ph.D., Johns Hopkins University, 1888; Assistant in Mathematics, Johns Hopkins University, 1888–89; Docent in Mathematics, Clark University, 1889–92; Assistant Professor, 1892–1903; Professor, 1903–; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

WILLIAM HENRY BURNHAM, PH.D.
Professor of Pedagogy and School Hygiene 767 Main St.

A.B., Harvard University, 1882; Instructor in Wittenberg College, 1882–83; Instructor, State Normal School, Potsdam, N. Y., 1883–85; Fellow, Johns Hopkins University, 1885–86; Ph.D., 1888; Instructor in Psychology, 1888–89; Docent in Pedagogy, Clark University, 1890–92; Instructor, 1892–1900; Assistant Professor, 1900–06; Professor, 1906–.

GEORGE HUBBARD BLAKESLEE, PH.D. 21 Downing St.
Professor of History and International Relations

A.B., Wesleyan University, 1893; A.M., Harvard University, 1899; Ph.D., 1903; Student, Johns Hopkins University, 1893–94; Parker Fellow, Harvard, 1901–02; Student, Universities of Berlin, Leipzig, and Oxford, 1901–03; Instructor in History, Clark College, 1903–04; Assistant Professor, 1904–09; Professor, 1909–; Instructor in History, Clark University, 1905–11; Professor, 1911–.

JOHN WALLACE BAIRD, PH.D.
Professor of Experimental Psychology 7 Lucian St.

A.B., University of Toronto, 1897; Student, University of Leipzig, 1898–99; Fellow, University of Wisconsin, 1899–1901; Fellow, Cornell University, 1901–02; Ph.D., 1902; Assistant in Psychology, 1902–03; Carnegie Research Assistant, 1903–04; Instructor in Psychology, Johns Hopkins University, 1904–06; Instructor in Psychology, University of Illinois, 1906–07; Assistant Professor, 1907–February, 1910; Assistant Professor of Experimental Psychology, Clark University, February, 1910–February, 1913; Professor, February, 1913–.

RALPH STAYNER LILLIE, PH.D
Professor of Biology 21 Dayton St.

A.B., University of Toronto, 1896; Student, University of Michigan, 1896–97; Fellow, University of Chicago, 1898–1901; Ph.D., 1901; Assistant in Physiology, Harvard University, 1901–02; Instructor, University of Nebraska, 1902–03; Adjunct Professor, 1903–04; Carnegie Research Assistant at Zoölogical Station, Naples, 1904–05; Instructor in Physiology, Harvard University, 1905-06; Johnston Scholar, Johns Hopkins University, 1906-07; Instructor in Physiological Zoölogy, University of Pennsylvania, 1907-12; Assistant Professor of Experimental Zoölogy, 1912-13; Instructor in General and Comparative Physiology, Marine Biological Laboratory, Woods Hole, Mass., 1902-; Professor of Biology, Clark University, October 1913-.

CHARLES A. KRAUS, PH.D.
Professor of Chemistry 11 Downing St.

B.S., University of Kansas, 1898; Fellow in Physics, Johns Hopkins University, 1899-1900; Research Fellow, Kansas University, 1900-01; Instructor in Physics, University of California, 1901-04; Research Assistant, Massachusetts Institute of Technology, 1904-08; Ph.D., 1908; Research Associate, 1908-12; Assistant Professor of Physical Chemical Research, 1912-14; Professor of Chemistry and Director of the Chemical Laboratories, Clark University, 1914-.

OTHER MEMBERS OF THE UNIVERSITY FACULTY

JOSEPH DE PEROTT
Lecturer in Mathematics 5 Hawthorn St.

Student, Universities of Paris and Berlin, 1877-80; Docent in Mathematics, Clark University, 1890-1904; Lecturer, 1904-.

LOUIS N. WILSON, LITT.D. 11 Shirley St.
Librarian of the University and Custodian of the Art Collection

Litt.D., Tufts College, 1905.

FRANK HAMILTON HANKINS, PH.D.
Assistant Professor of Sociology 4 Cabot St.

A.B., Baker University, 1901; Student, Columbia University, 1903-04; Scholar in Sociology, 1904-05; Fellow in Statistics, 1905-06; Student, 1907-08; Ph.D., Columbia University, 1908; Instructor in Economics, Clark College, 1906-07; Assistant Professor, 1908-13; Professor of Political and Social Science, 1913-; Instructor in Economics and Sociology, Clark University, 1906-07; 1908-15; Assistant Professor of Sociology, 1915-.

FRANK BLAIR WILLIAMS, PH.D.
Instructor in Mathematics 2 Isabella St.

C.E., University of Missouri, 1890; M. S., 1893; Engineering Work with the Mississippi River Commission, 1890-92; Teaching Fellow in Mathematics, University of Missouri, 1892-93; Survey Work with the Mississippi River Commission, 1894-95; United States Assistant Engineer in Tennessee River Improvement, 1895-97; Scholar in Mathematics, Clark University, 1897-98; Fellow, 1898-1900; Ph.D., 1900; Assistant Professor of Civil Engineering, Union College, 1900-05; Assistant Professor of Engineering and Mathematics, 1905-06; Professor of Engineering Mathematics, 1906-07; Assistant Professor of Mathematics, Clark College, 1907-08;

Professor, 1908–; Honorary Fellow in Mathematics, Clark University, 1909–10; Instructor, 1910–; Fellow of the American Association for the Advancement of Science; Member of the American Mathematical Society and of the Mathematical Association of America.

LECTURERS AND ASSOCIATES

EDWARD COWLES, M.D., LL.D., Boston
Non-Resident Lecturer in Psychiatry

A.B., Dartmouth College, 1859; A.M., 1863; Medical House Pupil, Retreat for the Insane, Hartford, Conn., 1860–62; M.D., Dartmouth Medical School, 1863; M.D., College of Physicians and Surgeons, New York, 1863; Medical Corps, United States Army, 1863–72; Resident Physician and Superintendent, Boston City Hospital, 1872–79; Medical Superintendent, McLean Hospital, Waverley, Mass., 1879–1903; Lecturer on Mental Diseases, Dartmouth Medical School, 1885–86; Professor of Mental Diseases, 1886–; Fellow by Courtesy, Johns Hopkins University, 1887-88; Clinical Instructor in Mental Diseases, Harvard Medical School, 1888–; LL.D., Dartmouth College, 1890; Non-Resident Lecturer in Psychiatry, Clark University, 1903–.

ARTHUR WALLACE CALHOUN, PH.D.
Lecturer in Sociology — 42 Maywood St.

A.B., University of Pittsburgh, 1906; Professor of English and Philosophy, New Windsor College, 1906–07; Professor of Latin and History, Normal School, St. Petersburg, Fla., 1907–09; Instructor in German and History, Florida State College for Women, 1910–11; Professor of Philosophy and Social Science, Lenox College, 1912–13; A.M., University of Wisconsin, 1913; Professor of Social Science, Maryville College, 1913–15; Fellow in Sociology, Clark University, 1915–16; Ph.D., 1916; Assistant Professor of Economics, Clark College, 1916–.

SAMUEL WEILLER FERNBERGER, PH.D. — 767 Main St.
Assistant Professor of Experimental Psychology

B.S., University of Pennsylvania, 1908; M.A., 1909; Ph.D., 1912; Assistant in Psychology, University of Pennsylvania, 1908–09; Instructor, 1910–12; Instructor in Experimental Psychology, Clark University, 1912–15; Assistant Professor, 1915–.

ALBERT NICOLAY GILBERTSON, PH. D.
Non-resident Lecturer in Psychology

A.B., University of Minnesota, 1908; A.M., 1909; Assistant in Sociology and Anthropology, University of Minnesota, 1908–09; Instructor in Psychology and Anthropology, University of Colorado, 1909-10; Instructor in Psychology, University of Minnesota, 1910–12; Instructor in Psychology and Child-Study, Minneapolis Kindergarten Normal School, and Lecturer in Psychology and Pedagogy, Minneapolis Normal Art School, 1911–12; Fellow in Anthropology, Clark University, 1912–13; Ph.D., 1913; Instructor in Psychology and Anthropology, University of Minnesota, 1913–15.

ROBERT HUTCHINGS GODDARD, PH.D.

Instructor in Physics 5 Bishop Ave.

B.S., Worcester Polytechnic Institute, 1908; A.M., Clark University, 1910; Ph.D., 1911; Instructor in Physics, Worcester Polytechnic Institute, and Student in Physics, Clark University, 1908–09; Fellow in Physics, 1909–11; Honorary Fellow, 1911–12, 1914–15; Research Instructor in Physics, Princeton University, 1912–13; Instructor in Physics, Clark College, 1914–15; Assistant Professor of Physics, 1915–; Instructor in Physics, Clark University, 1916–.

NORMAN SCOTT BRIEN GRAS, PH.D.

Instructor in History 12 Tirrell St.

A.B., A.M., Western University, 1906; A.M., Harvard University, 1909; Ph.D., 1912; University Scholar, Harvard University, 1907–08; Goodwin Fellow, 1908–09; Kirkland and Sheldon Traveling Fellow (Europe), 1910–12; Instructor in Economics, Western University, 1905–06; Assistant in History, Harvard University, 1909–10; Assistant Professor of History, Clark College, 1912–; Lecturer in History, Clark University, 1913–15; Instructor, 1915–.

RALPH GIBNEY HURLIN, PH.D.

Docent in Genetics 18 Oread St.

A.B., Brown University, 1912; A.M., 1913; Oliver Cromwell Gorton Arnold Fel; low and Assistant in Elementary Biology, 1913–15; Ph.D., 1915; Honorary Fellow in Biology, Clark University, 1915–16; Instructor in Biology, Clark College, 1915–16; Assistant Professor, 1916–.

JAMES EDMUND IVES, PH.D.

Research Associate in Physics 1030 Main St.

Assistant Curator, Academy of Natural Sciences, Philadelphia, 1887–93; Instructor in Physics, Drexel Institute, 1893–97; Jessup Student, Academy of Natural Sciences, Philadelphia, 1887–91; Student in Histology and Embryology, University of Pennsylvania, 1888–89; Student in Mathematics, 1893–95; Student in Physics, Cavendish Laboratory, Cambridge, England, 1896; Scholar in Physics, Clark University, 1897–98; Fellow, 1898–1901; Ph.D., 1901; Instructor in Physics, University of Cincinnati, 1901–03; Assistant Professor, 1905–10; Associate Professor, 1910–12; Honorary Fellow in Physics, Clark University, 1912–16.

KARL JOHAN KARLSON, PH.D.

Lecturer in Philosophy 6 Wyman St.

A.B., Clark College, 1909; Scholar in Psychology, Clark University, 1909–10; A.M. 1910; Fellow, 1910–12; Ph.D., 1912; Honorary Fellow in Psychology, Clark University, 1912–14; Lecturer in Philosophy, 1914–.

BENJAMIN SHORES MERIGOLD, PH.D.

Instructor in Chemistry 34 Chatham St.

A. B., Harvard University, 1896; A.M., 1897; Ph.D., 1901; Assistant in Chemistry, Harvard University, 1896–1900; Instructor in Chemistry, Worcester Polytechnic Institute, 1900–03; Assistant Professor of Chemistry, Clark College, 1903–08; Professor, 1908–; Instructor in Chemistry, Clark University, 1905–12, 1915–.

JAMES PERTICE PORTER, PH.D.

Lecturer in Psychology — 209 Lovell St.

A.B., Indiana University, 1898; A.M., 1901; Instructor in Psychology, 1900–03; In charge of work in Neurology, Indiana University Biological Station, 1901 and 1903; Honorary Fellow in Psychology, Clark University, 1903–09; Ph.D., 1906; Instructor in Psychology, Clark College, 1903–07; Assistant Professor, 1907–12; Dean of the Faculty, 1909–; Lecturer in Psychology, Clark University, February–June, 1910; Instructor, 1910–12; Lecturer, 1915–; Professor of Psychology, Clark College, 1912–.

GEORGE FREDERIC WHITE, PH.D.

Instructor in Biological Chemistry — 1 Lucian St.

S.B., Massachusetts Institute of Technology, 1906; Ph.D., Johns Hopkins University, 1910; Assistant in Analytical and Organic Chemistry, Massachusetts Institute of Technology, 1906–08; Fellow, Johns Hopkins University, 1909–10; Associate Professor of Chemistry, Richmond College, 1910–12; Instructor in Organic Chemistry, Clark College, 1912–13; Assistant Professor, 1913–; Docent in Biological Chemistry, Clark University, 1913–Jan. 1915; Instructor, Jan. 1915–.

ASSISTANTS

AMY ELIZA TANNER, PH.D.

Lecturer in the Children's Institute and Research Assistant to President Hall — 48 Downing St.

A.B., University of Michigan, 1893; Scholar, University of Chicago, 1894–95; Fellow, 1895–98; Ph.D., University of Chicago, 1898; Associate in Philosophy, 1898–1902; Professor of Philosophy, Wilson College, 1903–07; Honorary Fellow in Psychology, Clark University, 1907–09; Lecturer in the Children's Institute, 1909–; Research Assistant to President Hall, 1911–.

ROBERT BROWN TEACHOUT, A.M., South Lancaster

Fellow in Experimental Psychology and Research Assistant to Dr. Baird — 29 Tirrell St.

A.B., A.M., Dartmouth College, 1914; Fellow in Experimental Psychology, Clark University, 1914–.

LOUIS THOMPSON, A.M., South Haven, Michigan — 982 Main St.

Fellow in Physics and Research Assistant to Dr. Webster

B.S., Kalamazoo College, 1914; Scholar in Physics, Clark University, 1914–15; A.M., 1915; Fellow, 1915–.

HONORARY FELLOWS

IRVING ANGELL FIELD, PH.D.

Honorary Fellow in Biology — 1 Autumn St.

B.S., Denison University, 1903; Instructor in Ornithology, 1902–03; Assistant in Zoölogy, Harvard University, 1903–05; Austin Teaching Fellow, 1905–06; Professor of Chemistry and Biology, Western Maryland College, 1906-11; A.M., Harvard University, 1912; Instructor in Biology, Clark College, 1911-13; Honorary Fellow in Biology, Clark University, 1911-; Ph.D., 1913; Assistant Professor of Biology, Clark College, 1913-16; Associate Professor, 1916-.

WILLARD JAMES FISHER, PH.D., Woods Hole
Honorary Fellow in Physics 28 Baker St.

A.B., Amherst College, 1892; Instructor in Physics, Cornell University, 1903-12; Ph.D., 1908; Professor of Physics, New Hampshire College, 1912-16.

HARVEY CARSON GRUMBINE, PH.D., Lebanon, Pennsylvania
Honorary Fellow in Psychology 23 Gates St.

Ph.B., Wesleyan University, 1892; Ph.D., University of Munich, 1900; Instructor in English, Pennsylvania State College, 1900-01; Assistant Professor of English, Washington University, St. Louis, 1901-02; Professor of English Literature, College of Wooster, 1902-16.

CAREY EYSTER MELVILLE, A.B.
Honorary Fellow in Mathematics 16 Isabella St.

A.B., Northwestern University, 1901; Fellow in Mathematics, 1901-02; Graduate Student in Mathematics, Johns Hopkins University, 1902-03; Instructor in Mathematics, Case School of Applied Science, 1903-06; Honorary Fellow in Mathematics, Clark University, 1906-; Assistant in Mathematics, Clark College, 1906-09; Instructor, 1909-10; Instructor in Mathematics and Physics, 1910-11; Assistant Professor of Mathematics 1911-.

JONATHAN RIGDON, PH.D., Danville, Indiana
Honorary Fellow in Psychology 42 Maywood St.

A.B., Central Normal College, Ind., 1885; A.B., Boston University, 1891; Instructor in Psychology and Philosophy, Central Normal College, 1895-1903; President, *ibid.*, 1900-1903; Hon. Fellow in Psychology, Clark University, 1904-06; Ph.D., Boston University, 1905; Assistant in the History of Philosophy and Ethics, Clark College, 1905-06; President of Winona College, 1908-16.

LESLIE CUSTER WELLS, A.M.
Honorary Fellow in History 10 Lowell St.

A.B., A.M., Tufts College, 1901; Instructor in French, Tufts College, 1902-03; Graduate Student, Harvard University, 1903; University of Paris and Collège de France, 1905-06; Instructor in French, Clark College, 1903-04; Instructor in French and Spanish, 1904-08; Assistant Professor of Romance Languages, 1908-13; Professor of French and Spanish, 1913-.

FELLOWS

ADELBERT AMES, JR., LL.B., Lowell
Fellow in Experimental Psychology — 15 King St.

A.B., Harvard University, 1903; LL.B., Harvard Law School, 1906; Scholar in Experimental Psychology, Clark University, 1914–15; Fellow, 1915–.

RAYMOND BELLAMY, A.M., Moores Hill, Indiana
Fellow in Sociology — 28 Shirley St.

A.B., Moores Hill College, 1910; Professor of Chemistry and Physics, 1910–12; Fellow in Psychology, Clark University, 1912–13; A.M., 1913; Professor of Education, Emory and Henry College, 1913–15; Fellow in Psychology, Clark University, 1915–16.

THEODORE BENDA, A.M., Shelby, Nebraska
Fellow in Psychology — 103 May St.

A.B., University of Nebraska, 1908; A.M., 1914; Fellow in Psychology, Clark University, 1915–.

JOHN EGBERT BISHOP, A.M., Forest Grove, Oregon
Fellow in Chemistry — 84 Woodland St.

A.B., Pacific University, 1914; Scholar in Chemistry, Clark University, 1914–15; A.M., 1915; Fellow, 1915–.

IRVING THAYER BOARDMAN, A.M., Providence, Rhode Island
Fellow in Pedagogy — 77 Chatham St.

A.B., Brown University, 1914; A.M., 1915; Fellow in Pedagogy, Clark University, 1915–.

HAGOP BOGHOSS BOGHOSSIAN, A.M.
Fellow in Pedagogy — 103 May St.

A.B., Apostolic College, Konia, Asia Minor, Turkey, 1911; Instructor, 1911–14; A.M., Teachers College, Columbia University, 1915; Fellow in Pedagogy, Clark University, 1915–.

ETHEL BOWMAN, A.M., Cohasset
Fellow in Experimental Psychology — 767 Main St.

A.B., Wellesley College, 1900; Graduate Assistant in Psychology, 1904–05; A.M., 1907; Assistant, 1910–12; Instructor, 1912–14; Scholar in Experimental Psychology, Clark University, 1914–15; Fellow, 1915–.

HERBERT KIMBALL CUMMINGS, M.S.
Fellow in Physics — 24 Beaver St.

B.S., Worcester Polytechnic Institute, 1910; Instructor in Physics and Chemistry, Alfred University, 1910–11; Instructor in Physics, Worcester Polytechnic Institute, 1911-15; Student in Physics, Clark University. 1911-13; Scholar. 1913-15; M.S., University of Chicago, 1915; Fellow in Physics, Clark University, 1915-.

JAMES MCBRIDE DABBS, A.B., Mayesville, South Carolina
Fellow in Psychology 5 May St.

A.B., University of South Carolina, 1916.

EDWARD HENRY DARBY, A.M.
Fellow in Chemistry 5 Holland Road

A.B., Clark College, 1914; Scholar in Chemistry, Clark University, 1914-15; A.M., 1915; Fellow, 1915-.

WILBUR BROOKS DEXTER, A.M.
Fellow in Chemistry 7 West Oberlin St.

B.S., Colby College, 1914; Scholar in Chemistry, Clark University, 1914-15; A.M., 1915; Fellow, 1915-.

AUBREY AUGUSTUS DOUGLASS, A.M., Emporia, Kansas
Fellow in Pedagogy 90 Florence St.

A.B., Kansas State Normal School, 1912; Scholar in Pedagogy, Clark University, 1914-15; A.M., 1915; Fellow, 1915-.

RUPEN EKSERGIAN, M.S., Somerville
Fellow in Physics 2 Woodbine St.

S.B., Massachusetts Institute of Technology, 1914; S.M., 1915; M.S., Harvard University, 1915; Research Assistant in Electrical Engineering, Massachusetts Institute of Technology, 1915-16.

WALTER HENRY EVANS, B.D., Pacific Grove, California
Fellow in Psychology 103 May St.

Student, Cumberland University, 1908-09; Graduate, Lane Theological Seminary, 1911; B.D., Central Theological Seminary, 1916; Fellow of the Royal Geographical Society.

AUSTIN PERRY FINLEY, B.D., Bethany, West Virginia
Fellow in Psychology 138 Woodland St.

A.B., Kentucky University, 1899; A.M., 1906; B.D., Harvard Divinity School, 1908; Fellow in Psychology, Clark University, 1908-09; Dean of the Biblical Department, Drury College, 1909-11; Thos. W. Phillips Professor of Hebrew and Church History, Bethany College, 1911-16.

EARL NELSON JOHNSTON, PH.B., West Lafayette, Ohio
Fellow in Biology 26 Wayne St.

Ph.B., West Lafayette College, 1909.

MELVIN M. KNIGHT, A.M., Forth Worth, Texas
Fellow in Sociology 35 Beaver St.

Instructor in History, Texas Christian University, 1912–13; A.B., A.M., 1913; Assistant Professor of History, 1913–14; Professor of History, 1914–.

SHINICHI KURIHARA, A.M., Ibaraki, Japan
Fellow in Experimental Psychology 8 Loudon St.

Graduate, Aoyama Gakuin, 1910; Student, Drew Theological Seminary, 1913–15; New York University, 1914–15; B.D., Drew Theological Seminary, 1915; Scholar in Psychology, Clark University, 1915–16; A.M., 1916.

IVAN EUGENE MCDOUGLE, A.M., Richmond, Kentucky
Fellow in History 15 Shirley St.

A.B., Clark College, 1915; Assistant in History, 1915–; Scholar in History, Clark University, 1915–16; A.M., 1916.

HENRY COLE PARKER, A.M., Highland, California
Fellow in Chemistry 65 Downing St.

B.S., Kalamazoo College, 1915; Scholar in Chemistry, Clark University, 1915–16; A.M., 1916.

SAMUEL ERNEST POND, B.H., Woonsocket, Rhode Island
Fellow in Biology 24 Beaver St.

B.H., International Y.M.C.A. College, Springfield, 1912; Fellow in Biology, Clark University, 1915–.

CARROLL CORNELIUS PRATT, A.M.
Fellow in Experimental Psychology 54 Downing St.

A.B., Clark College, 1915; Scholar in Psychology, Clark University, 1915–16; A.M., 1916.

MARTIN LUTHER REYMERT, Kristiania, Norway
Fellow in Psychology 20 Richards St.

Graduate, Aars & Voss Gymnasium, Kristiania, 1903; Kristiania University, 1906; Fellow of the "American Scandinavian Foundation," 1916–17.

BENJAMIN L. WAITS, A.M., Florence, Alabama
Fellow in Mathematics 204 Chandler St.

B.S., B.Ed., Howard University, 1914; Scholar in Mathematics, Clark University, 1915–16; A.M., 1916.

JOHN THOMAS WARD, A.B., Springfield
Fellow in Chemistry 65 Downing St.

A.B., Clark College, 1914; Assistant in Chemistry, 1914–15; Scholar in Chemistry, Clark University, 1914–15; Fellow, 1915–; A.M., 1916.

LEONARD DUPEE WHITE, A.M.
Fellow in Sociology 38 Woodland St.

B.S., Dartmouth College, 1914; A.M., 1915; Parker Fellow, Dartmouth College, at the University of Chicago, 1914–15; Instructor in Government and Debating, Clark College, 1915–.

CURTIS T. WILLIAMS, A.M., Emporia, Kansas
Fellow in Psychology 89 May St.

A.B., Kansas State Normal School, 1913; Scholar in Psychology, Clark University, 1913–14; A.M., 1914; Instructor in English, State University of Arkansas, 1914–15; Fellow in Psychology, Clark University, 1915–.

SAMUEL ZELDIN
Fellow in Mathematics 37 Columbia St.

Graduate, Real Gymnasia, Orsha, Russia, 1913; Scholar in Mathematics, Clark University, February 1914–15; Fellow, 1915–.

WILLIAM EDWARD ZEUCH, A.M., Hopkinton, Iowa
Fellow in Sociology 938 Main St.

A.B., Lenox College, 1915; Scholar in Sociology, Clark University, 1915–16; A.M., 1916.

SCHOLARS

MILDRED ALLEN, A.B., West Roxbury
Scholar in Physics 6 Charlotte St.

A.B., Vassar College, 1916.

ROYAL TYLER BALCH, B.S., Kalamazoo, Michigan
Scholar in Chemistry 65 Downing St.

B.S., Kalamazoo College, 1916.

CHARLES BIRD, B.H., Birkenhead, England
Scholar in Psychology 3 Lowell St.

B.H., International Y. M. C. A. College, Springfield, 1916; Assistant in Physical Training, Clark College, 1916–.

JOHN EDWARD BRIERLY, A.B.
Scholar in History 34½ Douglas St.

A.B., Clark College, 1916; Assistant in History, 1916–.

ELIZABETH BROOKS, A.B., Moores Hill, Indiana
Scholar in Pedagogy 28 Shirley St.

A.B., Moores Hill College, 1914.

Genevieve A. J. Charbonneau, A.B., Nashua, New Hampshire
Scholar in Sociology 2 Sylvan St.

A.B., New Hampshire College, 1916.

Chung Yen Chiu, A.B., Chekiang, China
Scholar in Chemistry 23 Maywood St.

A.B., University of California, 1915; Student, Massachusetts Institute of Technology, 1915–16.

Elmer Bagnall Clark, B.H., Haverhill
Scholar in Psychology 46 May St.

B.H., International Y. M. C. A. College, Springfield, 1914; Assistant in Physical Training, Clark College, 1916–.

Roswell Frederick Curtis, A.B., Framingham
Scholar in Chemistry 20 Downing St.

A.B., Clark College, 1915; Assistant in Chemistry, 1915–; Scholar in Chemistry, Clark University, 1915–.

Paul Reber Dawson, A.B., Springfield
Scholar in Biology 1 Englewood Ave.

A.B., Clark College, 1916; Assistant in Psychology, 1916–.

Thomas Edward Day, A.B.
Scholar in Pedagogy 92 Maywood St.

A.B., College of the Holy Cross, 1916.

Frank Harold Ellsworth, A.B.
Scholar in Chemistry 109 Highland St.

A.B., Clark College, 1916.

Earl Wilbur Flohr, A.B., Vienna, Virginia
Scholar in Psychology 4 Englewood Ave.

A.B., Bridgewater College, 1916.

Henry Douglas Fryer, B.H., Willimantic, Connecticut
Scholar in Psychology 46 May St.

B.H., International Y. M. C. A. College, Springfield, 1914; Assistant in Physical Training, Clark College, 1916–.

Carleton Deane Haigis, B.S., Shelbourne Falls
Scholar in Physics 34 Boynton St.

B.S., Worcester Polytechnic Institute, 1915; Instructor in Physics, 1916–.

Carl David Johnson, A.B.
Scholar in Physics 1 Webster St.

A.B., Clark College, 1915; Assistant in Physics and Physical Training, 1915–16; Assistant in Physics, 1916–; Scholar in Physics, Clark University, 1915–.

Lewis Van Hagen Judson, A.B., Plainville, Connecticut
Scholar in Physics 46 Maywood St.

A.B., Clark College, 1916.

Tomehachi Kawamura, Nagasaki, Japan
Scholar in Chemistry 8 Loudon St.

Graduate, Nagasaki Normal School, 1905; Normal School Teacher's Certificate (Government) in Chemistry, 1912; Assistant in Research Laboratory, Tokyo Higher Normal School, 1912–14.

Leib Lehrer, A.B.
Scholar in Psychology 46½ Providence St.

A.B., Clark College, 1916.

Kelly Miller, Jr., B.S., Washington, D. C.
Scholar in Physics 204 Chandler St.

B.S., Howard University, 1916.

Lily Elma Mitchell, A.B., Plainville, Kansas
Scholar in Sociology 3 Woodbine St.

Pd.B., Missouri State Normal School, 1908; A.B., Maryville College, 1916.

Francis William Power, A.B.
Scholar in Chemistry 18 Lowell St.

A.B., Holy Cross College, 1915; Scholar in Chemistry, Clark University, 1915–.

Anne Henriette Elizabeth Ross, Milwaukee, Wisconsin
Scholar in Psychology 16 Charlotte St.

Scholar in Psychology, Clark University, Sept. 21–Dec. 22, 1916.

David Sage, A.B., London, England
Scholar in Sociology 16 Tirrell St.

A.B., Clark College, 1916; Assistant in Sociology, 1916–.

Walton Bremner Scott, B.S.
Scholar in Chemistry 143 Highland St.

B.S., Worcester Polytechnic Institute, 1916; Assistant in Chemistry, 1916–.

Walter Ira Waite, A.B., Concord, New Hampshire
Scholar in Psychology 25 Hollywood St.

A.B., New Hampshire College, 1916; Scholar in Psychology, Clark University, Sept. 21–Nov. 1, 1916.

Henry Clement Walsh, A.B.
Scholar in Pedagogy 88 Orange St.

A.B., College of the Holy Cross, 1915.

Angelina L. Weeks, A.B., Pittsfield
Honorary Scholar in Pedagogy 13 Gates St.

A.B., Mt. Holyoke College, 1894; Graduate Student, Massachusetts Institute of Technology, 1901–02; Professor of Biology and Chemistry, American College for Girls, Constantinople, Turkey, 1906–07; Honorary Scholar in Pedagogy, Clark University, 1914–.

Austin Lawrence Whittey, A.B.
Scholar in History 79 Fox St.

A.B., Clark College, 1916.

Ernest Richard Wood, A.B., Albany, Ohio
Scholar in Pedagogy 187 Beacon St.

A.B., Ohio University, 1916.

Yosohachi Yokogawa, Kobe, Japan
Scholar in Psychology 28 Hollywood St.

Graduate, Fukui Normal School, Japan, 1889; Professor of Pedagogy and Psychology, Kobe College, Kobe, Japan, 1907–.

Michael Jacob Zigler, A.B., Broadway, Virginia
Scholar in Pedagogy 23 Maywood St.

A.B., Bridgewater College, 1916.

Other Students

Henry Anson Bates, B.S., South Portland, Maine
Student in Sociology 3 Dix St.

B.S., Dartmouth College, 1916.

John Wesley Field, A.M., South Lancaster
Student in History

A.B., Union College, 1909; A.M., University of Nebraska, 1911; Instructor in History, South Western Junior College, 1911–13; Student, University of Berlin, 1913–14; University of Geneva, Sept. 1914–Feb. 1915.

Thomas Hancock, A.M., North Grafton
Student in Psychology

S.T.L., Wesleyan College, Montreal, 1906; B.D., Hartford Theological Seminary, 1914; Student in Psychology, Clark University, 1915–; A.M., 1916.

LeRoy Marshall Handy, A.B.
Student in History — 8 Kimball St.

A.B., Clark College, 1908.

James King, A.M., Shrewsbury
Student in Psychology

A.B., Oskaloosa College, 1912; S.T.B., Boston University, 1915; Scholar in Psychology, Clark University, 1915–16; A.M., 1916.

Gertrude Emma Kneeland, A.M.
Student in History — 15 Clifton St.

A.B., Brown University, 1915; Student in History, Clark University, 1915–; A.M., 1916.

Frederica Feitshans Kraus, A.B.
Student in Biology — 11 Downing St.

A.B., Kansas University, 1902; Student in Biology, Clark University, 1915–.

Ellen Augusta Maher
Student in Experimental Psychology — 766 Pleasant St.

Graduate, Worcester State Normal School, 1912.

Ellen Josephine O'Leary
Student in Experimental Psychology — 98 Hamilton St.

Graduate, Worcester State Normal School, 1912.

Gren Oren Pierrel, B.S.
Student in History — 60 Dover St.

B.S., Penn College, 1913; Student in History, Clark University, 1914–.

Mary D. Rebboli, A.M.
Student in History — 288 Pleasant St.

A.B., Wellesley College, 1903; A.M., 1908; Student in History, Clark University, 1915–.

William Franklin Slade, A.M., Southboro
Student in History

A.B., Bates College, 1913; B.D., Bangor Theological Seminary, 1913; Graduate Assistant in Geology and Astronomy, Bates College, 1913–14; Scholar in History, Harvard University, 1914–15; A.M., 1915; Student in History, Clark University, 1915–.

Laura Gertrude Smith
Student in Pedagogy — 862 Main St.

Alfred T. Ware, A.M.
Student in Psychology — 1160 Pleasant St.

A.B., Penn College, 1892; Student in History, Clark University, 1914–16; A.M., 1916.

ATTENDANTS UPON SATURDAY COURSES

MAUD H. BENDA, Worcester
JOHN P. CASEY, Worcester
HOMER E. COMTOIS, Worcester
M. HOWARD FERGUSON, Worcester
FLORENCE H. FULLER Worcester
MARY C. KEOUGH, Fitchburg
ELIZABETH M. LINCOLN, Leominster
ANNA T. MARBLE, Worcester
SARAH A. MARBLE, Worcester
ANNA L. METCALF, Worcester
JOHN E. MURRAY, Worcester
EDWIN J. SCHNIER, Sutton
CARL D. SMITH, Worcester
EDNA C. SMITH, Baldwinville
KATE E. SMITH, Worcester
CHESTER D. STILES, Grafton

UNDERGRADUATES ATTENDING ONE OR MORE UNIVERSITY COURSES

SAMUEL PITLIK

FLORENCE CHANDLER — 938 Main St.
Bursar, and Clerk of the University

ABBY JOHNSON, A.B. — Grafton
Assistant in the Bursar's office

MARY EVELYN FITZSIMMONS, S.B. — 982 Main St.
Private Secretary to the President

ADMINISTRATION

The trustees are the ultimate source of authority in all matters pertaining to the University. They act collectively, through committees, and also through the President of the University.

DUTIES OF THE PRESIDENT OF THE UNIVERSITY

The duties of this office were defined by the Trustees, May 23, 1889, as follows:

The President of the University shall consult frequently with the Trustees on all matters that concern the welfare of the University, and attend the meetings of the Board. He shall confer with each instructor concerning the development of his department, determine the duties and authority of each, and preside at the meetings of the Faculty. He shall be the authorized medium of communication between the Board of Trustees and the officers of instruction, individually and collectively, in all matters involving the administration of the University. The enactments of the Board concerning instructors and their work, and all requests, complaints and proposals from the Faculty to the Trustees shall be made known through him. He shall exercise or provide such superintendence over buildings, apparatus, books and other property, as will secure their protection and appropriate use. Expenditures must not be ordered by any instructor of the University without his previous consent or the express authority of the Board.

These duties were more fully defined by By-Laws enacted by the Corporation, Sept. 26, 1889. These are as follows:

BY-LAWS

1. The President of the University shall preside on all public academic occasions, shall direct the official correspondence, study the wants and interests of the whole University and exercise a general superintendence over all its concerns. His first care, and that of the authorities of the University, shall be the departments already established, and next those closely related to them; but no other department shall be established until those already introduced have been brought to the highest state of efficiency then possible. All acts, however, which shall involve the expenditure of money in the administration of the University's affairs, shall be subject to the approval of the Board of Trustees or the Finance Committee for the time being.

2. As the efficiency of a University depends chiefly upon the quality of its Faculty, the Board of Trustees will hold the President to a strict but reasonable accountability for the fidelity and ability of each instructor. The President only shall have the power to select and appoint all officers of instruction, subject to the approval of the Board of Trustees. To make wise and well-considered appointments, to maintain harmony within the Faculty, and to increase their efficiency in research and instruction shall be his most important duty. If at any time the President shall be negligent in the discharge of these or other duties, or is from any cause disabled from discharging them, they may be exercised by the Board of Trustees.

3. The President of the University shall be the medium of communication between the Trustees and Instructors, individually and collectively, upon all matters within the field of

action of either body. He shall attend all meetings of the Board of Trustees, of which he shall be notified, and shall participate in their deliberations, but without the power to vote. All complaints and requests from members of one body to the other shall be made through him.

4. The President shall call and preside over all official meetings of the Instructors, and a record of their proceedings shall be kept. These records are in no case to be made known to others than the Trustees. They shall always be in the custody of the President, but may be inspected by the Trustees, or either of them, at any time.

5. The President of the University, in the absence of the Trustees or Finance Committee, shall have the entire direction and control of the persons employed about the University and not engaged in the work of instruction; the duties of all such persons shall be assigned and they shall be appointed or removed by him, subject to the approval of the Finance Committee.

6. No instructor shall order any books or apparatus, or anything connected with the work of instruction (beyond his appropriation), without the approval of the President. No expense for the care of buildings or grounds, nor for alterations or repairs within and upon the same shall be made without the approval of the Board of Trustees or the Finance Committee, such alterations or repairs in no case to exceed the appropriations made for that purpose. If the Trustees, or Finance Committee,or any person, shall make contracts in behalf of the University without authority, the officer or person making such contract shall become individually responsible therefor.

7. The officers of instruction shall be appointed for a term of from one to five years. At the end of this period the work of each instructor will be subjected to a careful scrutiny upon the results of which his reappointment shall depend, always provided, however, that any Instructor will be liable to be dis-

charged at any time for incapacity, neglect of duty or for such other cause as shall seem good to the Trustees.

8. Each Instructor shall give stated lectures to however few. He shall actively and zealously strive to maintain the highest possible standard, shall work in a spirit of hearty sympathy and coöperation, and shall encourage research by precept and, if possible, by example.

9. The foregoing By-Laws are intended to embody the provisions contained in a vote passed by the corporation on the twenty-third day of May, A.D. 1889, upon the motion of Judge Devens. (See above.) If at any time hereafter any discrepancy shall be found to exist between the two, said By-Laws shall be so far modified as to conform to the provisions of said vote.

10. No instructor shall engage in any outside professional or technical pursuit without the approval of the Board, the Finance Committee, or the President.

11. These By-Laws, or any one of them, may be changed, amended, or repealed by a vote of three-fourths at least of the Trustees at any meeting of their Board duly called, notified, and held for that purpose.

GENERAL STATEMENTS

The University now consists of eight departments, in which all its work and that of Instructors, Fellows and Scholars is grouped.

These departments are as follows:

I. Mathematics
II. Physics
III. Chemistry
IV. Biology
V. Psychology
VI. Pedagogy
VII. Sociology
VIII. History

The Faculty

The University Senate consists of the full professors in the University, whose duty it is to take action upon general requirements for the Doctor's degree and other promotions, and to act and advise upon matters officially submitted to them.

The General Faculty considers all matters not otherwise provided for and in which all departments of the University are alike interested. It consists of all the members of the teaching staff in the University who shall be requested to sit in it.

ADMISSION

Only graduate students or those of equivalent attainments are admitted to full membership in the University, except in rare and special cases.

At present no entrance examinations are required; but by testimonials, diplomas, personal interviews, or written specimens of work, the authorities must be satisfied that the applicants have scholarship enough to work to advantage, and zeal and ability enough to devote themselves to their chosen field. The methods of the University are too costly, and its energy and funds too precious, to be spent upon those who are not well trained, promising and in earnest.

It is highly desirable that candidates entering any of the eight departments shall have, beside a knowledge of the other subjects commonly taught in colleges, a reading knowledge of French and German.

For the select students who are received, it is the purpose of the University to open all its privileges and to supply every incentive possible in the way of books, facilities, and, above all, direct personal stimulus. The chief as well as the best work of this University is individual and involves daily suggestion, encouragement and direction. The limited number of students permits more or less personal instruction in each case.

CLASSES OF APPOINTEES

No clearly marked line exists between students and instructors. Fellows who have attained some degree of mastery in a special line of work sometimes give brief special courses, which may be attended by professors.

This is a stimulus to the student, and both tests and exhibits power in teaching.

I. DOCENTS

The highest residential appointment not involving membership in the Faculty is that of Docent. These positions are designed for men of marked gifts and attainments who have at least attained the doctorate and wish to engage in research, teaching, or both.

Class A. Free Docents

Each docent of this class will be expected to deliver a limited number of lectures on some topic within his department. In so doing, he shall be entirely independent of other instructors both in his choice of a special topic and his manner of treating it, and responsible only to the President of the University, by whom he shall be appointed after consultation with the head of the department. The free docent shall have command of the resources of the department in the way of books, apparatus, etc., so far as this does not interfere with its regular work. By establishing free docents, the Faculty desires not only to maintain and guarantee the fullest academic freedom, but to expose itself to all the stimulus that can come by the rivalry of younger or outside men, and to introduce new topics and new departures in old ones.

Class B. University Docents

A University docent shall engage in research and may collaborate with the head of the department or other

member of the Faculty and supplement his work. He shall be appointed by the head of the department with the approval of the President.

Habilitation of Docents

A docent of either class may prepare and read in public an habilitation address representing original work after a term of service of a length and under conditions to be determined by the Faculty for each individual case. Upon doing this, he may be formally presented with a certificate or diploma granting him the *venia docendi* or licentiate, which shall not be a title or degree, but shall attest his fitness as scholar or investigator for an academic position and shall be regarded by the University as a brevet collegiate professorship. The fee for such a certificate shall be $25, which the Faculty shall have power to remit. The compensation of a docent of either class, if any, shall be determined by the President, and the fees to be paid him by students, if any, shall be determined by the Bursar.

It is believed that the difficulties of college authorities in selecting suitable professors may be somewhat diminished by the existence of such a select body of scholars of guaranteed scientific training, ability, and approved power to teach, and that this new grade may aid in raising the standard of academic scholarship.

II. QUIZ MASTERS

Each member of the University Faculty may, with the approval of the President, appoint one or more quiz masters who with the aid of his lecture notes, or

otherwise, shall conduct review classes upon his lectures and who may hold preliminary tests, but who shall not lecture or give instruction save as review. These positions shall be regarded as honorary and as a privilege of more advanced students in perfecting their own knowledge and acquiring practice in instruction.

III. NON-RESIDENT LECTURERS

The representatives of each department may, with the approval of the President, bring eminent experts for exchange or other lectures of a special nature at any time during the academic year. They may also in return, with the approval of the President, give similar brief courses in other institutions, provided this does not interfere with their full efficiency for the work of this University.

IV. HONORARY FELLOWS

Those who have already advanced to the Doctor's degree may be appointed Honorary Fellows and given the privileges of the University, including those of the Library. In past years many who have already taken this degree, either in this country or abroad, and who are awaiting academic appointment, have found these positions both helpful for their own further research and development and also advantageous for obtaining the collegiate and university appointments that they seek.

V. CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Candidates for the Doctor's degree must have previously taken the Degree of Bachelor of Arts or have had

a substantial equivalent for the training implied by that degree.

At least one year, but in most cases three years, of graduate work are necessary for this degree. Examinations for it, however, may be taken at any time during the academic year when, in the judgment of the University authorities, the candidate is prepared, provided the requirement of one year's residence has been absolved.

For this degree one requirement is a dissertation upon an approved subject, to which it must be an original contribution of value. To this capital importance is attached. It must be reported on in writing by the chief instructor before the examination, printed at the expense of the candidate, and at least one hundred copies given to the University. However, in case of a dissertation of unusual length, or containing expensive plates, the Faculty shall have power, at the request of the candidate, to reduce this number of presentation copies to fifty.

Such formal or informal tests as the Faculty may determine shall mark the acceptance of each student or Fellow as a candidate for this degree. One object of this preliminary test shall be to insure a good reading knowledge of French and German. Such formal candidature shall precede the examination itself by a period prescribed in the special rules below.

The fee for the Doctor's degree is $25, payable before the examination. The presentation copies of the dissertation must be in the hands of the Librarian before the diploma is delivered. In exceptional cases, and by special action of the Faculty, the act of promotion may precede the presentation of the printed copies of the dissertation.

An oral, but no written, examination is required upon at least one minor subject in addition to the major before an examining jury composed of at least four members, including the head of the department and the President of the University, who is authorized to invite any person from within or without the University to be present and to ask questions. The jury shall report the results of the examination to the Faculty, who will recommend satisfactory candidates for the degree.

For the bestowal of this degree, the approbation of the Board of Trustees must in each case be obtained by their signature upon the diploma. They desire that the standard of requirements for it be kept the highest practicable, that it be reserved for those of superior ability and attainment only, and that its value be never suffered to depreciate.

It is to the needs of candidates for this degree that the lectures, seminaries, laboratories, collections of books, apparatus, etc., are especially shaped, and no pains will be spared to afford them every needed stimulus and opportunity. It is for them that the Fellowships and Scholarships are primarily intended, although any of these honors may be awarded to others.

On November 14th, 1900, the following vote was passed by the Board of Trustees:

> That the University will admit candidates for the degree of Doctor of Philosophy and will confer that degree without regard to sex.

Special Rules concerning the Doctor's Degree

I. *Residence.* No candidate shall receive the degree of Doctor of Philosophy without at least one academic year's previous residence.

II. *Candidature for the Doctor's Degree.* Every applicant for the Doctor's degree shall fill out, before October fifteenth, the regular application blank provided at the office. This schedule shall be submitted to the head of the department. Before affixing his signature he shall satisfy himself, in such manner as he may desire, as to the fitness of the applicant.

III. When countersigned, this schedule shall be filed with the President, and the applicant will be examined in French and German by the annual committee for that purpose.

IV. In case of a favorable report by this committee, the applicant shall be a regular candidate for the degree.

V. Candidates complying with all preliminary conditions, including the examinations in French and German, before November first will be allowed to proceed to the doctor's examination at any time between May fifteenth following and the end of the academic year.

VI. *The Doctor's Dissertation.* The dissertation must be presented to the instructor under whose direction it is written, and reported upon by him before the doctor's examination. In every case the dissertation shall be laid before the jury of examination, at the time of examination, in form suitable for publication. This provision shall not, however, preclude the making of such minor changes later as the chief instructor may approve.

VII. The dissertation shall be printed at the expense of the candidate and the required copies deposited with the Librarian within one calendar year after the first of October following the examination. The candidate alone will be held responsible for the fulfilment of these conditions.

VIII. The favorable report of the chief instructor, filed in writing with the Clerk of the University, shall be a sufficient imprimatur or authorization for printing as a dissertation. The printed copies shall bear upon the cover and title page the statement of approval in the following words, over the signature of the chief instructor:

> A Dissertation submitted to the Faculty of Clark University, Worcester, Mass., in partial fulfilment of the requirements for the degree of Doctor of Philosophy, and accepted on the recommendation of
>
> (NAME OF CHIEF INSTRUCTOR)

IX. *Examinations for the Doctor's Degree.* The examinations for the doctor's degree may be held at any time during the academic year, provided that at least one academic year has elapsed since the completion of the preliminaries of candidature, except in the case of fulfilment of these conditions between the beginning of any academic year and November first of that year, to which case Rule V applies. The examinations shall be held at such hours and places as the President may appoint.

X. Examinations may also be held during the regular vacations of the University, but for these an additional fee of five dollars to each examiner and the reasonable travelling expenses of any examiners who are out of town, all payable in advance, will be required.

VI. CANDIDATES FOR THE DEGREE OF MASTER OF ARTS

This degree is conferred upon candidates who comply with the following requirements:

1. The candidate shall have previously taken the degree of Bachelor of Arts, or have had a substantial

equivalent for the training implied by that degree, to be determined by special vote of the Faculty; but such degree or training must involve a good preparation for the work proposed for the Master's degree, in order that it may be accepted.

2. The candidate must devote a full academic year to post-graduate work in this University after receiving the Bachelor's degree or the training accepted as its equivalent. This work shall be mainly in one department, but the candidate may do also such other work as shall be advised by the head of his principal department —whose approval of the whole course shall be necessary. In particular cases, the candidate may be allowed, by special vote of the Faculty, to divide his work between two years; but the aggregate must, in all cases, amount to a full year's work, at least.

3. The candidate must satisfy the representatives of his principal department that he has done his work faithfully and has mastered the subjects involved, by such written and oral examinations and other tests as the department may require. The head of the department shall make a written report to the Faculty of the grounds on which the candidate is recommended, specifying the amount and character of his work, and this report shall be filed in the office.

4. The candidate must present a thesis or written report on some topic included in his course or closely related to it, that shall receive the approval of the representatives of his principal department, be accepted by the Faculty, and filed in the office.

5. Every candidate recommended for the Master's degree shall pay a fee of ten dollars.

6. The Master's degree will be conferred at the annual commencement in June of any year on those candidates only who shall have made written application to be considered as such on or before January 15th preceding and shall have fulfilled all the conditions here specified at least one week before Commencement, at which time the academic year shall be regarded as ending for the purposes of section 2.

VII. SPECIAL STUDENTS NOT CANDIDATES FOR A DEGREE

Any one desiring to undertake a special and approved line of research, and whose attainments are such as to satisfy the requirements of the University, may also be received. This class includes persons who may desire to devote themselves exclusively to one or more of the special branches—mathematics, physics, chemistry, biology, psychology, pedagogy, economics and sociology, or history—but who do not care to matriculate or become candidates for a degree.

These students, provided they satisfy the heads of the departments of their training and competency in one subject, in which they must be advanced (although they may be less so, or even beginners, in other subjects), may be allowed entire freedom in their choice and combination of studies, and as special students may enjoy all the privileges of the University.

These students may, with the approval of the President, be received for less than an entire year.

VIII. PRELIMINARY CANDIDATES

Non-university students of less special or less advanced standing than the above classes, who contemplate becoming candidates for some higher degree, may also be received.

Students of this class must satisfy the authorities of the University of their attainments and that they contemplate advancing to a degree higher than that of A.B. The privileges and status of these students will be more fully defined later. They may, in exceptional cases, be elected to Scholarships.

FELLOWSHIPS AND SCHOLARSHIPS

From the George F. Hoar Fund of $100,000 provided by the generosity of Andrew Carnegie, the sum of $3,000 is now available for Junior and Senior Fellowships in the University. While the sums attached to these appointments are not fixed, a Senior Fellow may receive $200 together with the remission of fees; which makes the value of the appointment $300. A Junior Fellow may receive $100 with remission of fees, which makes the value of the appointment $200. Besides these, other appointments of Senior and Junior University Scholarships, with remission of fees, are made.

A CITIZEN'S FUND

A citizen of Worcester has given a fund of $5,000, the income of which is to be used for the aid of "some one or more worthy native born citizens of the city of Worcester who may desire to avail themselves of the advantages of the institution."

Mrs. Eliza W. Field has also given $500 to be called the "John White Field Fund," the income of which is "to provide for the minor needs of a Scholar or Fellow."

The following regulations apply to the award of the income of the Field Fund:

1. Regard is had to the intellectual ability of the candidate as well as to need of pecuniary assistance.

2. Only candidates who have spent three months at the University are considered.

3. The head of each department will consider and report to the Faculty desirable cases in his department.

4. Applications are received not later than December 15th, and the awards made as soon as possible after the Christmas recess.

THE ELIZA D. DODGE FUND

Mrs. Dodge has given $1,000 to be known as the "Eliza D. Dodge Fund," the income only to be expended in aid of graduate students of limited means engaged in research work.

PURPOSE AND CONDITIONS OF FELLOWSHIPS AND SCHOLARSHIPS

Fellowships at Clark University are intended for young men and women of promise who desire to pursue post-graduate studies in order to fit themselves for intellectual careers. It is desirable, but not required, that candidates for these positions should intend to proceed to the degree of Doctor of Philosophy or to equivalent attainments. In general, those intending to devote themselves to some

special branch of learning are preferred to those directly fitting themselves for one of the three learned professions, although the latter are not excluded.

No application blanks are provided, but it is desired that the candidate should state fully and in writing his previous course of study and submit testimonials or diplomas, especially such as indicate a decided preference for some particular department. These should be accompanied also, if practicable, by some specimen of the candidate's work. Applications will be considered in April and in October and should be in the hands of the President on or before the first day of either month. In special cases vacancies may be filled by appointments at any time during the year. The names of unsuccessful candidates will not be made public.

Fellows must reside in Worcester during the entire academic year, devote themselves to special studies under the direction of their instructors, and give such evidence of progress or proficiency before the end of the year as the authorities shall require. It is generally expected that they will undertake some work of research during the year. They must coöperate in promoting harmony, order, and all the ends of the University, must not teach elsewhere, and may be reappointed at the end of the year. Being intended primarily as honors, both Fellowships and Scholarships are awarded without reference to pecuniary needs, so that those Fellows able and desiring to do so may relinquish the emolument and retain the title.

Besides field work, excursions to institutions (public and private), coaching and cram classes, clubs, examinations, and other modes by which knowledge now seems best imparted and retained, the following educational methods are prominent:

Lectures. The Trustees desire that each instructor, of however few students, should prepare and deliver regular lecture courses, with diagrams, illustrative apparatus, and reference to standard text-books and the best current literature upon each topic. Advanced students are also encouraged to supplement the work of the professors by giving occasional special lectures and courses. Public lectures will be given from time to time.

Seminaries and Conferences. These are stated meetings for joint systematic work, under the personal direction of the professor, in some special part of his subject. Here students preparing theses and papers for publication in the journals edited at the University read them in incomplete form for mutual criticism and help. Here, also, the results of individual reading are reported for the benefit of all; views are freely criticised; new inquiries, methods, comparisons, standpoints, etc., suggested. From the mutual stimulus thus given many important works have proceeded and the efficiency of universities has been greatly increased.

Laboratory Work. For beginners this has been from the first the best of all forms of apprenticeship, bringing student and professor to a closer and mutually stimulating relation. Here the manipulation of apparatus is learned, processes are criticised, results obtained by other investigators are tested, and methods discussed and perfected, with a view to developing that independence in research which is the consummation of scientific culture.

NOTICES

The charge for tuition, giving all the privileges of the University, but not covering the laboratory fees, is $100 per annum.

Board and lodging can be obtained near the University at very moderate rates.

Intending students will be given information, so far as possible, upon any of these or other points, in advance of official announcement, upon addressing the Clerk of the University, Miss Florence Chandler, Worcester, Mass.

All members of the University are expected to be present at the opening of each term and to continue in attendance to its close.

The following are the statements and announcements of the departments for the academic year, 1917–1918.

I. MATHEMATICS

PROGRAMME FOR 1917-1918

INSTRUCTION IN MATHEMATICS

The chief aim of the department is to make independent investigators of such students as have mathematical taste and ability; these naturally look forward to careers as teachers of the higher mathematics in colleges and universities, and we believe that the course of training best adapted to the development of investigators is also that which is most suitable for all who would be efficient college professors, even if they are not ambitious to engage in research. The first essential of success in either of these lines is the habit of mathematical thought, and the direct object of our instruction is the acquisition of this habit by each of our students. With this end in view, we expect every student to make himself familiar with the general methods and most salient results of a large number of different branches of mathematics, conversant with the detailed results and the literature of a few branches, and thorough master of at least one special topic to the extent of making a real contribution to our knowledge of that subject.

In accordance with these principles, the instruction is given by means of introductory, advanced and special courses of lectures, seminaries, and personal guidance in reading and investigation.

The introductory courses (mostly given in alternate years) treat the following subjects:

ANALYTIC GEOMETRY OF CONICS, HIGHER PLANE CURVES, QUADRICS, HIGHER SURFACES, AND TWISTED CURVES; 5 hours a week, through the year.

DIFFERENTIAL EQUATIONS, AND CALCULUS OF VARIATIONS; 5 hours a week, through the year.

THEORY OF FUNCTIONS OF REAL AND IMAGINARY VARIABLES, ELLIPTIC FUNCTIONS, AND DEFINITE INTEGRALS; 5 hours a week, through the year.

THEORY OF NUMBERS; 2 hours a week, one half-year.

HIGHER ALGEBRA; 2 hours a week, through the year.

ALGEBRAIC SUBSTITUTIONS AND THEIR APPLICATION TO THE THEORY OF EQUATIONS; 2 hours a week, one half-year.

ALGEBRAIC INVARIANTS; 2 hours a week, one half-year.

FINITE DIFFERENCES; 3 hours a week, through the year.

It is expected that every student will take each course in the earliest year of his residence in which it is given, unless he has already completed an equivalent course elsewhere. The chief object of these courses is to make the student familiar with the various methods of mathematical research and the concepts of mathematical thought at the present day. Thus, for example, curves and surfaces are treated by modern methods from the beginning, with adequate consideration of the discoveries of the great geometers of recent times. The usual college courses in the theory of algebraic equations, analytic geometry, and the differential and integral calculus furnish all the necessary preparation for these introductory courses, although it is very desirable that the student be acquainted with the properties of determinants and their application to the solution of linear equations, and with the methods of solving differential equations of the simpler types. Deficiencies in these subjects may be made up by attendance on the corresponding courses in the Collegiate Department of the University.

Special advanced courses, open to all who are prepared for them, are given annually in subjects varying with the interests of the instructors and the needs of the students. These advanced courses are not repeated at regular intervals, but properly prepared students will receive the personal assistance of one or other of the instructors in reading any

subject not announced for the year in which they desire to take it.

The number and scope of the advanced courses given each year have been, thus far, regulated by the number of students qualified to profit by them and by the individual interests of the instructors; these courses will be increased, both in number and variety, whenever a real demand for such an increase shall make itself apparent. While the present purely scientific character of the University precludes instruction in strictly technical branches, we hope that the time is not far distant when the demand shall make it advisable, and increased facilities shall make it possible, to announce courses in Descriptive Geometry, Graphical Statics, Mathematical Astronomy, Vital Probabilities, and all the more important applications of mathematics to other sciences and to technical subjects. The applications of mathematics to physics already receive adequate consideration, and the further extension of such applications awaits only a demand for it on the part of students.

The subjects in which advanced courses may be expected to be given every few years include the following:

HISTORY OF MATHEMATICS.

ARITHMETIC: Numerical computations; Theory of numbers; Finite differences and the Calculus of operations; Probabilities and the Theory of errors; Continued Fractions and their Applications.

ALGEBRA: Substitution-groups and the Galois theory of equations; Invariants; Quadratic forms; Simultaneous equations (including Restricted systems); Multiple algebra.

HIGHER ANALYSIS: Differential equations, ordinary and partial; Continuous groups; Definite integrals and Fourier's series.

THEORY OF FUNCTIONS: Functions of real and complex variables; Point-aggregates; Elliptic functions; Abelian integrals.

GEOMETRY: Modern synthetic geometry; Analytic geometry of higher plane curves, higher surfaces, and twisted curves; Rational and uniform transformations of curves and surfaces; Infinitesimal geometry; Analysis situs; Quaternions; Hyperspace and non-euclidean geometry.

SYMBOLIC LOGIC.

Other courses will be given whenever there is a demand for them, as in the past. The instructors are always glad to assist students in any line of mathematics that falls within the range of their own studies. The small number of students makes it possible to give personal attention to individuals, and the intimate and confidential relation thus established between pupil and teacher is an advantage that cannot be overestimated and ought not to be left out of account by the prospective student in determining where his studies shall be pursued.

For the academic year 1917–18, the following courses of lectures are announced:

BY PROFESSOR STORY

Advanced Courses:

CONTINUED FRACTIONS AND THEIR APPLICATIONS; 3 hours a week, through the year.

HYPERSPACE AND NONEUCLIDEAN GEOMETRY; 3 hours a week, through the year.

ALGEBRAIC INVARIANTS; 3 hours a week, first half-year.

DIFFERENTIAL GEOMETRY; 3 hours a week, second half-year.

SEMINARY FOR ADVANCED STUDENTS; through the year.

BY PROFESSOR TABER

Introductory Course:

DIFFERENTIAL EQUATIONS AND CALCULUS OF VARIATIONS; 5 hours a week, through the year.

Advanced Courses:

THEORY OF BILINEAR FORMS; 2 hours a week, first half-year.

THEORY OF INTEGRAL EQUATIONS; 2 hours a week, second half-year.

SEMINARY; through the year.

BY PROFESSOR WEBSTER

[See announcement of Department of Physics, courses 10, 11, 13, 14.]

BY M. DE PEROTT

Introductory Courses:

THEORY OF NUMBERS; 2 hours a week, first half-year.

ALGEBRAIC SUBSTITUTIONS; 2 hours a week, second half-year.

BY DR. WILLIAMS

Introductory Course:

HIGHER ALGEBRA; 2 hours a week, through the year.

While desirous of supplying all possible facilities to those who wish to pursue studies in special branches, and to those who, already occupying permanent positions, have but a limited leave of absence, we have made it our chief object to provide a thorough training for those who, having just completed a college course, have not yet entered upon their life-work. This provision consists of such courses of lectures, seminaries, and individual assistance as should enable a faithful student endowed with the proper natural ability to satisfy the requirements for the degree of Doctor of Philosophy at the end of his third year with us. The requirements for this degree have been determined by our conception of the ideal teacher, as already stated. To acquire the necessary breadth of knowledge of mathematics as a whole, the candidate is expected to attend, during his first two years, specified introductory courses of lectures on the general principles, methods, and results of all the more important branches of pure mathematics, to supplement these lectures by private reading and to take an active part in the seminary. In the seminary, a special topic more or less directly connected with the subject of some lecture, is assigned, from time to time, to each student, who is required to read it up and make an oral report upon it before the class. Each candidate for the Doctor's degree is expected to attend a number of advanced courses. He spends the greater part of his third year in the original investigation, under the constant personal guidance of one of the instructors, of a topic of his own selection. In preparing for this investigation he is required to make a practically complete bibliography of the subject and to read all the more important available articles that have been written on it. The results of the investigation, embodied in a dissertation suitable for printing, must be submitted to the instructor under whose direction the work was done, and must receive his approval before the candidate will be admitted to the final examination for the degree. This approval will not be given unless the dissertation is satisfactory in form and completeness and the results are sufficiently novel and important to constitute a real contribution to science. The dissertation is, in fact, the main criterion by which the candidate is judged, and no amount of other work will compensate for its defects.

Each of the instructors is engaged in research and has always a number of investigations planned for himself, which have often been carried to a well advanced stage but are not completed for want of time. Such incomplete investigations are given to properly prepared candidates for the Doctor's degree, and they receive from the instructor all the assistance necessary for the completion of the work, thus becoming, to a certain extent, collaborateurs with the instructor.

The preparation of a bibliography of any topic is greatly facilitated by a classified index of mathematical literature on the card-catalogue plan, which has been prepared under the supervision of Professor Story and now includes over one hundred thousand titles of periodical articles, separate memoirs, and books in all fields of pure mathematics. This index is much more complete than the Royal Society's catalogue, even in the restricted field of that catalogue (periodicals published between 1800 and 1900), and will be extended as rapidly as possible.

The ability of our graduates to carry on research and the excellence of the work actually done is assured by the regulation that each dissertation accepted by us as worthy of the degree shall be printed with the explicit approval of a member of our Faculty. It is evident that, whereas any one that has the necessary preparation and taste for mathematics may profit by the advantages here afforded, only those who have a certain amount of mathematical genius can secure the degree.

In making appointments to fellowships and scholarships we have endeavored to maintain the same high standard. We are on the lookout for mathematical geniuses; but it is difficult to determine from the evidence of others whether candidates come up to our standard or not; so that we have adopted the general policy of giving the best appointments to those only that have been with us for at least one year, and about whom we are in position to judge for ourselves. Of course, this policy could not be carried out during the earlier years of the University, and its effect is apparent in the fact that, whereas seventy-five per cent of the students that entered the mathematical department during the first three years remained with us but one year, only thirty-three per cent of those that have been admitted from 1892 to the present time left at the end of their first year. We do not mean to imply that those who left before completing our course were inferior in ability to those who remained three years, but we desire particularly to encourage men who can and will go forward to the degree.

Nearly all of those who have studied mathematics with us have adopted teaching as a profession, sixty-eight per cent are now members of college faculties, and thirteen per cent are engaged in higher school work. Those who have received the doctor's degree have generally secured at once desirable positions in which to begin their life-work, and most of them have already acquired for themselves, by distinguished ability, very decided influence in the institutions with which they are connected.

The degree of Master of Arts will be conferred upon students who complete with credit an approved course of one year and present a satisfactory thesis.

Every facility for the study of special branches will be given to properly prepared students who are not candidates for a degree, as also to those who, having already attained to the Doctor's degree (here or elsewhere), wish to continue mathematical study or investigation.

MATERIAL FACILITIES

The library is provided with the more important textbooks, treatises, and memoirs on the various branches of mathematics, as well as the principal journals and transactions of learned societies that are devoted to any considerable extent to mathematics. A list of these journals will be found below.

The mathematical department possesses a good collection of models, a Thomas arithmometer, and an Amsler planimeter with revolving table.

LIST OF JOURNALS RELATING TO THE EXACT SCIENCES IN THE UNIVERSITY LIBRARY

(On account of the European war some of the foreign journals marked "to date" are incomplete.)

AMSTERDAM.

Koninklijke akademie van wetenschappen. Verhandelingen, 1854 to date. Complete.

Revue semestrielle des publications mathématiques. 1893 to date. Complete.

BALTIMORE.

American chemical journal. 1879 to date. Complete.

American journal of mathematics. 1878 to date. Complete.

BANGKOK.

- Siam society. Journal. 1905-07.

BERLIN.

- Berliner mathematische Gesellschaft. Sitzungsberichte. 1902 to date. Complete.
- Chemisches Centralblatt. 1897 to date. Complete.
- Deutsche chemische Gesellschaft. Berichte. 1868 to date. Complete.
- Fortschritte der Physik. 1847 to date. Complete.
- Jahrbuch über die Fortschritte der Mathematik. 1868 to date. Complete.
- Journal für die reine und angewandte Mathematik. 1826 to date. Complete.
- Königlich-preussische Akademie der Wissenschaften. Mathematische und naturwissenschaftliche Mittheilungen aus den Sitzungsberichten. 1882-97. Complete.
- Zeitschrift für angewandte Chemie. 1888 to date. Complete.

BOLOGNA.

- Istituto di. Bologna. Reale academia delle scienze.
  - Commentarii. 1731-1791. Complete.
  - Novi commentarii. 1834-1849.
  - Memorie fis. e mat. 1806-1910.
  - Memorie. 1850 to date. Complete.
  - Scientia; rivista di scienza. 1910 to date. Complete.

BOSTON.

- American academy of arts and sciences. Proceedings. 1870 to date. Complete.
- North American Review. 1815–1886.
- Technology review. 1899 to date. Complete.

BOULDER, COLORADO.

- University of Colorado. Studies. 1902 to date. Complete.

BRAUNSCHWEIG.

- Deutsche physikalische Gesellschaft. Berichte. 1903 to date. Complete.
- Jahresbericht über die Fortschritte der Chemie. 1847 to date. Complete.

BRESLAU.

- Kaiserlich-Leopoldinisch-carolinische deutsche Akademie der Naturforscher. 1843.

BRUXELLES.

- Académie royale des sciences des lettres et des beaux-arts de Belgique.
  - Bulletins. Ser. 3. 1889 to date.
  - Mémoires couronnés et mémories des savants étrangers. 1889-90.

CAMBRIDGE, ENGLAND.

- Cambridge philosophical society.
  - Proceedings. 1843 to date. Complete.
  - Transactions. 1822 to date. Complete.

CAMBRIDGE, MASSACHUSETTS.

- Science. 1883 to date. Complete.

CHARLOTTESVILLE, VIRGINIA.

- Annals of mathematics. 1884 to date. Complete.

CHICAGO.

- Astrophysical journal. 1895 to date. Complete.
- School science and mathematics. 1901 to date. Complete except vol. 13, Nos. 1-2.
- Terrestrial magnetism. 1896 to date. Complete.

COLUMBIA, MISSOURI.

- University of Missouri studies. Science series. vol. 1. 1905-07.

DRESDEN.

- Zeitschrift für Chemie und Industrie der Kolloide. 1906 to date. Complete.

EASTON, PENNSYLVANIA.

American chemical society.

Chemical abstracts. 1907 to date. Complete.

Journal. 1879 to date. Complete.

Proceedings. 1878 to date. Complete.

Journal of industrial and engineering chemistry. 1909 to date. Complete.

EDINBURGH.

Edinburgh mathematical society. Proceedings. 1884-1907.

Edinburgh philosophical journal. 1819-1826.

Edinburgh royal society transactions. 1873 to date Complete.

GÖTTINGEN.

Königliche Gesellschaft der Wissenschaften. Nachrichten von der k. Gesellschaft der Wissenschaften und der Georg-Augusts-universität. 1853 to date.

GREIFSWALD.

Archiv der Mathematik und Physik. 1901 to date.

HAARLEM.

Hollandsche maatschappij der wetenschappen. Archives néerlandaises des science exactes et naturelles. 1866 to date. Complete.

HALIFAX.

Nova Scotian institute of science.

Proceedings and transactions. Halifax. 1890 to date. Complete.

HALLE.

Zeitschrift für Electrochemie. 1895 to date. Complete.

HAMBURG.

Mathematische Gesellschaft. Mittheilungen. 1890 to date. Complete.

Zeitschrift für anorganische Chemie. 1892 to date. Complete.

HEIDELBERG.

Annalen der Chemie. 1832 to date. Complete.

INDIANAPOLIS.

Indiana academy of science. Proceedings. 1895-98.

ITHACA.

Journal of physical chemistry. 1896 to date. Complete.

LAWRENCE, KANSAS.

Kansas University science bulletin. 1902-1908.

LEIPZIG.

Acta Eruditorum, 1682-1731. 50 vols. Supplementa, 1692-1734. 10 vols. Indices generales, 1693-1733. 10 vols. in 5.

Nova Acta Eruditorum, 1732-1782. 13 vols. Supplementa, 1735-1739. 3 vols. in 2.

Annalen der Physik. 1824 to date. Beiblätter, 1889 to date. Complete.

Archiv für Optik. vol. 1. 1908.

Chemische Novitäten. 1905-08.

Deutsche Mathematiker-vereinigung. Jahresbericht. 1890 to date. Complete.

Encyklopädie der mathematischen Wissenschaften mit Einschluss ihrer Anwendungen.

Fortschritte der Chemie, Physik und physikalischen Chemie. 1909.

Internationale Mathematiker-congresse. Verhandlungen. 1897 to date. Complete.

Jahrbuch der drahtlosen Telegraphie und Telephonie. 1908 to date. Complete.

Jahresbericht über die Leistungen der chemischen Technologie. 1856 to date. Complete.

LEIPZIG (Continued).

Journal für praktische Chemie. 1834 to date. Complete.

Königlich-sächsische Gesellschaft der Wissenschaften.

Berichte über die Verhandlungen der mathematisch-physischen Classe. 1849 to date. Complete.

Abhandlungen der mathematisch-physischen Classe. 1852 to date. Complete.

Mathematische Annalen. 1869 to date. Complete.

Zeitschrift für Chemie. 1866-71.

Zeitschrift für Mathematik und Physik. 1856 to date. Complete.

Zeitschrift für physikalische Chemie. 1887 to date. Complete.

Zeitschrift für mathematische und naturwissenschaftliche Unterricht. 1903 to date.

Zeitschrift für wissenschaftliche Photographie, Photophysik und Photochemie. 1903 to date. Complete.

LIÈGE.

Société royale des sciences. Mémoires. 1843 to date. Complete.

LONDON.

British academy. Proceedings. 1905. 1907.

British association for the advancement of science. Reports. 1831 to date. Complete.

Chemical news and journal of physical science. 1904 to date. Complete.

Chemical society of London.

Annual reports on the progress of chemistry. 1905 to date. Complete.

Journal. 1849 to date. Complete.

Electrician. 1891 to date. Complete.

International catalogue of scientific literature. 1902 to date. Complete.

London mathematical society. Proceedings. 1865 to date. Complete.

Royal Society.

Proceedings. 1800 to date. Complete.

Philosophical transactions. 1665 to date. Complete.

Mathematical gazette. 1896 to date. Complete.

Nature. 1870 to date. Complete.

Nineteenth century. 1877 to date. Complete.

Philosophical magazine. 1798 to date. Complete.

Physical Society of London. 1876 to date. Complete.

Quarterly journal of pure and applied mathematics. 1857 to date. Complete.

Quarterly review. 1809-1885.

Science abstracts. 1898 to date. Complete.

Science progress in the 20th century. 1907 to date. Complete.

MADISON.

Wisconsin academy of arts and sciences. Transactions. 1898.

MANILA.

Philippine journal of science. 1906 to date. Complete.

MILANO.

Annali di matematica, pura ed applicata. 1889 to date.

Reale istituto lombardo di scienze e lettere. Classe di scienze mathematieech naturali.

Rendiconti. 1864-67. Complete.

Rendiconti. 1868 to date. Complete.

Memorie. 1843 to date. Complete.

MONTREAL.

Royal society of Canada. Proceedings and transactions. 1882-1906.

München.

Königlich bayerische Akademie der wissenschaften. Sitzungsberichte der mathematisch physikalischen Klasse. 1871 to date. Complete.

NEW HAVEN.

American journal of science and arts. 1871 to date. Complete.

NEW YORK.

American mathematical society.
- Annual register. 1892 to date. Complete.
- Bulletin. 1894 to date. Complete.
- Transactions. 1900 to date. Complete.

American society of biological chemists. Proceedings. 1907 to date. Complete.

Appleton's journal of literature, science and art. 1869-76.

Electrical world and engineer. 1907 to date. Complete.

Journal of biological chemistry. 1905 to date. Complete.

The Minerva. 1824-26.

New York Mathematical Society. Bulletin. 1891-94. Complete.

Popular science monthly. 1872 to date. Complete.

Physical review. 1894 to date. Complete.

OXFORD.

Messenger of mathematics. 1862 to date. Complete.

PALERMO.

Circolo matematico di Palermo. Rendiconti. 1887 to date. Complete.

PARIS.

Annales de Chemie et de physique. 1789-1908.

Annales scientifiques de l'École normale supérieure. 1864 to date. Complete.

Association française pour l'advancement des Sciences. Comptes rendus des sessions. 1873 to date. Complete.

Bulletin des sciences mathématiques. 1870 to date. Complete.

Bureau international des poids et mesures. 1881 to date. Complete.

École polytechnique. Journal. 1794 to date. Complete.

Institut de France. Académie des sciences. Comptes rendus hebdomadaires des séances. 1835 to date. Complete.

Journal de mathématiques pures et appliquées. 1836 to date. Complete.

L'éclairage électrique. 1894-1907.

L'enseigmement mathématique. 1899 to date. Complete.

Nouvelles annales de mathématiques. 1842 to date. Complete.

Revue des deux mondes. 1908 to date. Complete.

Revue générale des sciences pures et appliquées. 1903 to date. Complete.

Revue scientifique. 1863 to date. Complete.

Société chimique de Paris. Bulletin. 1858 to date. Complete.

Société mathématique de France. Bulletin. 1873 to date. Complete.

ST. PETERSBURG.

Journal of physical chemistry. (Russian Text.) Chemical section and physical section. 1909 to date.

PHILADELPHIA.

Academy of natural sciences of Philadelphia. Proceedings. 1890 to date. Complete.

American electrochemical society. Transactions. 1902 to date. Complete.

Lippincott's magazine of literature, science and education. 1868-1881.

PISA.

Il Nuovo Cimento. 1891 to date. Complete.

ROME.

Reale accademia dei lincei. Atti. Rendiconti. etc. 1847 to date.

SACRAMENTO.

Lick observatory. Publications. 1887-1903.

SALEM, MASSACHUSETTS.

American Association for the advancement of science. Proceedings. 1848 to date. Complete.

SIDNEY.

Australasian association for the advancement of science. 1888 to date. Complete.

STOCKHOLM.

Acta mathematica. 1882 to date. Complete.

Arkiv för matematik, Astronomi och fysik. 1903 to date. Complete.

Bibliotheca mathematica. 1884 to date. Complete.

STRASSBURG.

Zeitschrift für physiologische Chemie. 1877 to date. Complete.

STUTTGART.

Jarhbuch der organischen Chemie. 1908 to date. Complete.

Sammlung Chemischer und chemisch-technischer Vorträge. 1896 to date. Complete.

TOKYO.

Journal of the College of Science of the Imperial University of Japan.

Mathematico-physical society. Proceedings (Tôkyô sûgakubuturigakkwai kizi). 2nd Ser. 1901 to date. Complete.

TOULOUSE.

Université de Toulouse. Faculté des sciences. Annales. 1887 to date. Complete.

URBANA, ILLINOIS.

University of Illinois. University studies. 1900-1908.

WASHINGTON, D. C.

National academy of sciences.

Biographical memoirs. 1877 to date. Complete.

Memoirs. 1883-1902.

Reports. 1883 to date. Complete.

U. S. Bureau of Standards. Bulletin. 1905 to date. Complete.

U. S. Naval observatory. Publications 1900-1903.

U. S. Naval observatory. Astronomical and meteorological observations. 1885-1889.

WIESBADEN.

Zeitschrift für analytische Chemie. 1862 to date. Complete.

WIEN.

Kaiserliche Akademie der Wissenschaften.

Denkschirften; mathematisch-naturwissenschaftliche Classe. 1850-1908.

Sitzungsberichte der mathematisch-naturwissenschaftlichen Classe. 1848 to date. Complete.

Monatshefte für Mathematik u. Physik. 1908.

Monatshefte für Chemie und verwandte Theile anderer Wissenschaften. 1881 to date. Complete.

WORCESTER.

The Mathematical review. 1896–97.

II. PHYSICS

The Department of Physics of Clark University is exclusively a department for graduate study and research in pure and applied physics. In order to set forth to the intending student the facilities of this department, stress may be laid on a number of points in which it is believed that the conditions here are exceptional.

First, the fact that the attention of the professor is not distracted from the needs of the student by other duties, which, combined with the small number of students in the department, enables an amount of personal attention to be given to each one which is perhaps unique in this country. The head of the department is able to see each student and to give him personal advice in the conduct of his researches or his studies every day if necessary. The facilities without which no graduate department of research in physics can be complete are comprised under three heads: first, a systematic course of lectures in theoretical or mathematical physics; second, a laboratory with a sufficient number of rooms for individual work and with a sufficient equipment of apparatus and an instrument shop for the speedy production of whatever may be necessary for the research in hand; third, a library containing the classic works on physics, with full sets of journals and proceedings of learned societies by which the history of progress, past and present, may be studied, and kept up-to-date by the continual purchase of the latest works. In all these directions the facilities offered by this department invite attention.

The lecture courses are so arranged as to cover in a cycle of two years all the principal subjects and methods of theoretical physics. The pursuit of them will fit the student to read and study with facility any memoirs on mathematical physics. The courses are so arranged that, although they follow in order, it is possible for a student to begin in either year of the cycle. The regular courses are those not marked with a star, and constitute a course of from five to seven hours weekly. The starred courses are delivered at irregular intervals, according to the demands or the presence of students of sufficient advancement.

LECTURES

1. DYNAMICS. GENERAL PRINCIPLES, EQUATIONS OF LAGRANGE AND HAMILTON, METHODS OF HAMILTON AND JACOBI, SYSTEMS OF PARTICLES, RIGID BODIES.

This course is fundamental for the pursuit of all the others, and includes a detailed account of the principle of Least Action and the differential equations of Lagrange, preparatory to their application to other parts of mathematical physics such as optics and electricity.

2. NEWTONIAN AND LOGARITHMIC POTENTIAL FUNCTIONS, ATTRACTION OF ELLIPSOIDS.

This course is a necessary preliminary to the study of electricity and magnetism, of hydrodynamics, and of the figure of the earth.

3. ELASTICITY, HYDRODYNAMICS, WAVE AND VORTEX MOTION, DYNAMICAL BASIS OF SOUND AND LIGHT.

This course is the basis of applications of the theory of wave motion to sound, light, electro-magnetism, and earthquake waves, and to the study of meteorology.

3a. * DYNAMICS OF CYCLIC AND OSCILLATORY SYSTEMS, WITH APPLICATIONS TO THE THEORY OF ELECTRICITY, SOUND AND LIGHT.

The substance of the preceding courses is contained in Professor Webster's Treatise on Dynamics, B. G. Teubner, Leipzig.

3b. * THE THEORY OF RESONANCE AND OF GENERALIZED IMPEDANCE WITH APPLICATIONS TO THE MEASUREMENT OF SOUND AND TO WIRELESS TELEGRAPHY.

This course takes up Professor Webster's original researches in acoustics, and also shows how the methods there employed bear on the fundamental electrical phenomena involved in wireless telegraphy.

4. ELECTRICITY AND MAGNETISM. THE CLASSICAL THEORIES AND THE THEORY OF MAXWELL, WITH AN ACCOUNT OF THE PRINCIPAL METHODS FOR THE SOLUTION OF PROBLEMS AND APPLICATIONS TO ABSOLUTE MEASUREMENTS.

The substance of this course is found in Professor Webster's Mathematical Treatise on the Theory of Electricity and Magnetism, London, Macmillan & Co.

4a. * RECENT DEVELOPMENTS IN ELECTRICAL THEORY, INCLUDING THE THEORY OF LORENTZ AND THE PRINCIPLE OF RELATIVITY.

The application to the theory of electrons and to the optics of bodies in motion.

5. THE THEORY OF LIGHT. PROPAGATION OF LIGHT, DIFFRACTION, REFLECTION AND REFRACTION, DISPERSION, DOUBLE REFRACTION, POLARIZATION, METALLIC REFLECTION, MAGNETO-OPTICS, X-RAYS AND CRYSTALS.

5a. * COMPARISON OF THEORIES OF THE ETHER.

Critical and historical examination of the various mechanical explanations of the luminiferous ether, including those of Green, McCullagh, Kelvin, Maxwell, Sommerfeld and Larmor.

5b. * GEOMETRICAL OPTICS. PROPERTIES OF SYSTEMS OF RAYS, AND THEIR VARIOUS ABERRATIONS. HAMILTON'S CHARACTERISTIC FUNCTION OR EIKONAL. APPLICATIONS TO OPTICAL INSTRUMENTS.

6. THERMODYNAMICS. THERMO- AND ELECTRO-CHEMISTRY.

The establishment of the two laws of thermodynamics, and their application, by means of the methods of Gibbs and Helmholtz, to the examination of physical and chemical phenomena. Application to heat-engines, including steam, gas, and oil engines, the flow of gases and vapors, and the steam turbine. The conditions of chemical equilibrium, phenomena of electrolysis, osmotic pressure, and capillarity.

7. THE KINETIC THEORY OF GASES. THE MAXWELL-BOLTZMANN THEOREM AND THE ELEMENTS OF STATISTICAL MECHANICS.

8. * THE THEORY OF RADIATION AND OF A BLACK BODY.

The relations obtained from the laws of Kirchhoff, Stefan, Wien, and Planck, by the recent applications of thermodynamics.

9. * THE PHENOMENA OF CONDUCTION OF ELECTRICITY IN GASES, AND OF RADIOACTIVITY, AND THEIR BEARING ON THE STRUCTURE OF THE ATOM.

10. THE PARTIAL DIFFERENTIAL EQUATIONS OF MATHEMATICAL PHYSICS.

Laplace's Equation, Equation of Thermal and Electrical Conduction, Equation of Wave-motion, Helmholtz's Equation, Lorenz-Beltrami

Equation, Telegrapher's Equation, and their special cases; methods of Cauchy, Green and Riemann-Volterra; Normal functions, Developments in Series, Fourier's Series, Legendre's, Laplace's, Bessel's and Lamé's functions.

This course is one of the most important for the physicist, and treats a great variety of subjects from the most varied fields, grouping them all into a connected system, and embracing all the methods of theoretical physics.

11.* THE ELEMENTS OF INTEGRAL AND INTEGRO-DIFFERENTIAL EQUATIONS, AND THEIR APPLICATION TO MATHEMATICAL PHYSICS.

12.* SELECTED CHAPTERS IN THE APPLICATION OF THEORETICAL PHYSICS TO COSMICAL PHENOMENA, INCLUDING PROBLEMS IN GEODESY, THE TIDES, METEOROLOGY, SEISMOLOGY, AND TERRESTRIAL MAGNETISM.

13.* LINEAR DIFFERENTIAL EQUATIONS.

The applications of the theory of functions to the linear differential equations of the second order which arise in mathematical physics.

14.* ORTHOGONAL SURFACES AND CURVILINEAR COÖRDINATES AND THEIR APPLICATIONS.

The courses for 1917-18 will be 5, 5b, 6, 7, 8, 10.

In addition to the above formal courses there is held a weekly Colloquium, or meeting for the informal discussion of subjects not treated in the lectures, and for the presentation by the students of reports on important articles appearing in the journals. A part of the work of the colloquium consists in the systematic presentation of certain classical researches, more or less connected with the lectures, in preparing which the students make use of the original sources of information, thus gaining much acquaintance with the methods of the masters in research. The work of the colloquium has an excellent effect in training students to present their ideas in a systematic manner before an auditory.

Among the various lines of investigation now attracting the attention of physicists the following are preëminent in importance. First, the interrelations between the luminiferous ether and ordinary matter, and the modifications necessary to be made in Maxwell's theory in order to explain the known optical and electrical phenomena of bodies in motion, and that aspect of the theory which deals with the properties of the small electric bodies known as electrons. This portion of mathematical physics is extremely new, and has hardly begun to appear in university courses in this country. Second, the structure of the atoms of matter, to which the subjects of spectroscopy and the new and fascinating field of radio-activity give the most promising clew. Third, the thermodynamics of radiation in general, which is most intimately connected with the first, and about which a similar remark may be made as to the lack of instruction.

Of branches of applied physics now awaiting the attention of the mathematical physicist may be mentioned meteorology, seismology, and geophysics in general, in all of which the accumulation of experimental data is ahead of the development of theory, to such an extent in meteorology that Professor Arthur Schuster has said that it would be advisable to suspend all meteorological observations for the next ten years, until the theory should have in some degree caught up with the mass of information already accumulated. The theory of meteorology depends on complicated applications of hydrodynamics and thermodynamics; so as to make great demands upon the mathematical physicist, but the field is a rich one to him possessed of the skill to cultivate it. The study of earthquake phenomena is one that is now becoming of great importance in this country, while the investigation of terrestrial magnetism has lately made great advances.

It is almost obvious to the trained investigator that no one can expect to become a physicist of the first rank without a thorough training in mathematical physics, as without that the results of experiment will never be collected into a coherent system worthy the name of an exact science. Furthermore all mathematical physics must rest upon mechanics, the principles of which are of an importance transcending that of any other branch of natural science. It is for this reason that the courses in physics in this department begin with mechanics, and are developed progressively in a systematic manner. They have the advantage of having been deliberately planned for the needs of students of pure physics, as experience has shown them to be prepared by the various colleges, and of being all delivered by the same person, so that logical consistency and continuity of method are assured. The waste of time often incurred by repetitions of the same subject and of changes of notation by various instructors is thus totally avoided. Attention is called to the fact that *no branch of physics is left unprovided for in the course of lectures.*

The aim of the department is to insure in its students some acquaintance with all the various fields of experimental physics, to develop in them the power of exact measurement, to accustom them to exact reasoning from experiment to theory, and to encourage original research conducted on a sound basis. To this end students will be put to work in the laboratory upon experiments of sufficient difficulty to give them skill in measurements of precision, and to enable them to become familiar with the precautions and corrections necessary to be employed in exact work. After a sufficient amount of experience has been gained, and the student has shown himself to be possessed of sufficient originality to warrant independent investigation, he will be encouraged to take up for himself an original research in the hope of making a personal contribution to science. In this research he will have at all times the benefit of the direction and advice of the professor.

It should be urged upon intending students to prepare themselves, not only in ordinary laboratory measurements, but also in mathematics, the lack of proper mathematical preparation being a serious drawback to the appreciation of the lectures. In particular may be recommended for study not merely those portions of the calculus which deal with the working out of many indefinite integrals, etc., but the theoretical portions which deal with the ideas of partial derivatives, definite integrals, and their practical manipulation, together with enough analytic geometry to involve the properties of lines and *surfaces* of the second order, and a fair amount of the elements of determinants. As suitable textbooks for preparation may be recommended to the student Lamb's, Osgood's or Gibson's Calculus, C. Smith's Analytical Geometries, and Muir's or Hanus's Determinants. Appell, *Elêments de l'analyse mathêmatique* may be very strongly recommended to the intending student for study before and during his course at the University.

It cannot be too strongly urged that the student should, from the beginning, be able to read French and German with ease and to make use of works in them.

REQUIREMENTS FOR THE DOCTOR'S DEGREE

1. The ability to read at sight specimens of scientific French and German, tested before the first of November preceding the Doctor's examination by a committee of two members of the Faculty.

2. The successful passing of an examination upon the general subject of Experimental Physics[1] and upon the subjects named above in the regular course in Theoretical Physics, as a major requirement, together with an examination in one minor subject, *to be determined in each particular case by the head of the Physical Department.* This subject will be Mathematics or Chemistry.

3. The presentation of a satisfactory dissertation, involving a substantial amount of original work, and forming a contribution of value to pure science. The presentation of the dissertation is a prerequisite to examination. The time of residence necessary for the proper fulfilment of the above requirements will generally be at least three years, of which at least one will be very largely devoted to work on the dissertation. Students will not be encouraged to enter upon the work of a dissertation until they have acquired sufficient experience to enable them to specialize with advantage.

The aim of the department is to produce physicists rather than electricians, acousticians, opticians, engineers, or narrow specialists of any sort, for although in the nature of things one will be obliged to know more of one subject than of others, yet it seems evident that no thorough knowledge of any branch can be gained without a comprehensive view over the whole subject. Without this the specialist, or the experimentalist lacking a knowledge of mathematics, will continually be falling into pitfalls which the more wary avoid. Furthermore it can be but a detriment to science to encourage research in new fields by immature and ill-prepared minds and hands.

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[1] Every student is recommended to provide himself with Winkelmann's *Handbuch der Physik* as a work for continual reference.

The following statement is here inserted for the benefit of students of mathematics.

The minor in Mathematical Physics consists of the subject-matter of courses 1, 2, 3, and 10, which are intended to constitute the equivalent of five hours a week for one year. Course 10 is given in alternate years to the other courses. The subject-matter of the course is contained in Dr. Webster's treatise on *Dynamics* and his work on Partial Differential Equations, now in press.

THE LABORATORY

The laboratory occupies three floors of one wing of a large well lighted building free from disturbances, and admirably adapted to the purposes of a physical laboratory. On the ground floor is a room extending across the end of the building forty-five feet long by twenty-two feet wide, with windows on three sides, above which are three similar rooms. A lift running from the bottom to the top floor affords means of transporting apparatus, while its shaft furnishes space for manometer or barometer tubes. In the lower room are four piers with heavy stone tops, and two others below the floor on which can be placed heavy tables.

Also on the ground floor is a large dark room, partially below ground, in which the temperature is tolerably constant, containing a very large and heavy pier. The engine and storage-battery room contains a kerosene engine and dynamo on the same foundation and sixty storage cells of ten amperes capacity, constituting the power-supply. The engine may be started at a few moments notice, even at night, but has been superseded for most purposes by a motor-generator which is driven by an external supply and furnishes all needed direct current. The storage cells are conveniently arranged so that each one is accessible from each side, from above and below, and the ventilation is excellent, while the room is as light and clean as the work-rooms. Distributing switchboards allow the current from the dynamo or any section of the battery to be supplied to any of the rooms. On the same floor are three rooms constituting the workshop, one of the most important parts of a research department of physics. The first room is devoted to wood-working and pattern-making, and accommodates also a bench for soldering. The next room contains the machinist's bench, two engine-lathes and drill-press, and the third room a Rivet precision bench-lathe, jeweler's lathe and Brown & Sharpe universal milling-machine. There is no countershafting in the building, each tool being driven by a separate electric motor, so that perfect quiet and steadiness are ensured. In the shop are executed all repairs and alterations of apparatus, and the new apparatus requiring continual experiment is constructed. Most of the principal pieces of apparatus belonging to this department have been thus constructed. In this manner, by having a mechanic always present, an extremely great economy in time and money is effected, and vexatious delays, which would otherwise completely arrest the progress of the work, are avoided. Facilities and encouragement are given to the students to construct apparatus for themselves.

On the main floor are the lecture room, the director's office, the large room used as the director's private laboratory and apparatus room, and three other convenient rooms for research. Two of these are arranged so that they may be darkened for photography, and one is heavily padded with felt for acoustical researches. The large room on the top floor is diagonally divided into two, one dark and devoted to the Rowland twenty-foot diffraction grating and other spectroscopic apparatus, and with a photographic dark room attached. Close by is a high potential battery of two thousand small storage cells. Every room in the laboratory contains sinks, gas and electric light connections, and several circuits connecting with the switch-board in the battery-room.

The laboratory is well equipped with apparatus for research, besides having the facilities above described for the construction of instruments of any sort needed for that purpose. In addition may be mentioned a large collection of diagrams illustrative of mathematical physics, many of them being originals of the figures in Professor Webster's "Electricity and Magnetism" and "Dynamics," and a number of interesting models used in teaching dynamics, thermodynamics, and electricity. Among them are Maxwell's Dynamical Top and a number of other interesting tops, Maxwell's and Rayleigh's induction models, Gibbs's, van der Waals's and other thermodynamical surfaces. This collection of drawings and models can probably not be matched in this country, and is continually being increased.

The laboratory affords so much space that it is rarely necessary to put more than one student in a single room. Every student receives personal attention in the laboratory from the professor whenever he needs it, and is continually in receipt of instruction and suggestion by personal contact, the best form in which information can be imparted. Emphasis should be laid on the advantage to the research student of the contact with a professor who has no other duties or interests than the furtherance of research, in an institution devoted to this as its main object.

In the library Clark University has one of its strongest features. With a large separate building, administered in the most liberal manner with a view to the advantage of the research student, and with ample funds for the purchase of books, its facilities in the Department of Physics can hardly be surpassed. It may be said to contain all of the most important works in many languages, and is continually kept up-to-date, any book wanted needing only to be mentioned to be procured. The library is particularly rich in journals, among which are included the transactions of the learned societies of England, France, Germany, Italy, Austria, Holland, and Belgium. Other sets are being continually added. A list of journals will be found on pages 50–55. There are few subjects connected with physics which may not be thoroughly studied in this library.

III. CHEMISTRY

It is the purpose of the Department of Chemistry to provide the student with that broad training in the fundamental principles of chemistry which shall adequately equip him for a subsequent scientific career.

A considerable proportion of the students entering this Department naturally look forward to an academic career. It is not intended, however, to provide training for such men alone; for the equipment for technical research, whether for public or private interests, requires equally a thorough familiarity with the fundamental underlying principles of science and with the methods of experimental investigation.

Whether a student shall devote himself to pure or to technical research is a matter of individual interest and inclination rather than of training. The purpose of the Department is to provide the training on lines sufficiently broad to enable the student to exercise a choice between technical and purely scientific work.

REQUIREMENTS

In addition to the formal requirements for entrance to the University, the student entering the Department of Chemistry should have a thorough knowledge of the fundamentals of chemistry, including general chemistry, qualitative and quantitative analysis, organic chemistry, and the elements of physical chemistry. The student should also have had mathematics through the elements of the calculus, and not less than two years' work in physics, including general physics, the elements of thermodynamics with labo-

ratory work in heat, and the elements of the theory of electricity and magnetism with laboratory work in electrical measurements.

Students entering this Department, who have not had the work in both physics and mathematics as outlined above, will be expected to make up the deficiency during their first year. Excellent courses in these subjects, which are open to University students, are offered in the College. Students whose training in chemistry falls below the requirements as above outlined, but who have had more extended courses in physics and mathematics may be allowed to enter the Department on condition that any deficiencies in chemistry will be made up during the first year.

A reading knowledge of French and German is indispensable for advanced work in chemistry.

Students who have done graduate work in other universities may enter the Department of Chemistry, receiving credit for residence (excepting the last year), provided the work done has been of such character as to provide the student with the necessary training.

INSTRUCTION

In order that a student may receive a broad training in chemistry, it is necessary that his time be properly distributed between class room work, research work, and library work. The Department endeavors, therefore, to keep the student occupied with these three lines of effort, without exclusion of one or more of them.

The following courses of instruction are offered:

1. THEORETICAL CHEMISTRY I. Dr. Kraus. Lectures, conferences and problems. After developing the fundamental conceptions of thermodynamics, a study is made of systems comprising phases of constant composition. This is followed with a study of gaseous equilibria and

heterogeneous equilibria in systems comprising phases of constant composition.

2. Theoretical Chemistry II. Dr. Kraus. A continuation of the preceding course. The Nernst Heat Theorem is first examined together with allied matters. This is followed by a study of equilibria in systems comprising any number of phases of variable composition including electrolytic solutions. This course extends over two years

3. Inorganic Chemistry. Dr. Kraus. This course consists of conferences in which the various elements and their compounds are discussed. The students are given numerous references to the literature. It is intended here to familiarize the student with the properties of matter in its more important forms and to bring his knowledge down to that of the current literature. Both physical and chemical properties are considered. This course thus becomes supplementary to the two preceding ones. It extends over three years.

4. The Phase Rule. Dr. Kraus. Conferences with references to the literature. A study is made of one, two and three component systems including both metallic and non-metallic substances.

5. Dispersed Systems. Dr. Kraus. Conferences with references to the literature. This course is devoted to the study of colloids and of surface phenomena in general.

6. Photochemistry. Dr. Kraus. Lectures and conferences. A study is made of the influence of radiations on chemical reactions.

7. The Process of Electrical Conduction. Dr. Kraus. Lectures and conferences. A detailed study is made of the conduction process in gases, electrolytic solutions, fused salts and metals.

8. Properties of Radioactive Elements. Dr. Kraus. Lectures and conferences. This course is devoted to a study of radioactive substances and the radiations accompanying their transformations.

9. History of Chemistry. Dr. Merigold. A course of lectures accompanied by supplementary reading. This course is intended to cover the historical development of the science in both practical and theoretical aspects. An attempt is made to give the student some knowledge of the individuality of the men whose work has resulted in the growth and development of modern chemistry. Attention will be given also to the relation of chemistry to other sciences at various periods of development.

10. Advanced Analytical Chemistry. Dr. Merigold. In this course will be considered special features of analytical chemistry, both

practical and theoretical. The work will include such topics as special analytical methods with particular reference to sources of error, limits of accuracy, and theoretical considerations; methods of exact analysis required in atomic weight work and other fields of research necessitating precise analysis. Particular attention is paid to results of recent investigation in this field.

11. ORGANIC CHEMISTRY. Dr. White. Conferences are held at which the fundamental conceptions and problems of organic chemistry are dealt with in a systematic way. Current literature, applicable to the subjects under discussion, is reviewed. The course extends over three years.

12. RESEARCH CONFERENCE. Dr. Kraus. This course is devoted mainly to a discussion of investigations which are being carried out in this laboratory.

13. GLASS BLOWING. Dr. Kraus. A brief course in the manipulation of glass, quartz, etc.

Courses 1, 2, 3, 5, 6, 7, 10, 11, 12 and 13 are given during the present year. (Courses 1, 2, 3, 4, 8, 9, 11, 12 and 13 will be given during the year 1917–1918.)

MINOR SUBJECT. Students choosing chemistry as major subject will be expected to take a minor in mathematics, physics, or biology. The choice of a minor subject will be made with reference to the student's previous preparation and to his ultimate aims as an investigator.

RESEARCH. In order that the student may become familiar with the methods of research and gain a knowledge of the minute details of one or more branches of chemistry he will carry on one or more researches throughout his three years of residence. Such researches will in all cases be in part experimental in nature. The subject for research may be one suggested by the student or one suggested by the instructor. In any case, the different investigations carried on in the laboratory at any one time will be largely diversified in order that the students may come into intimate contact with as many branches of chemistry as possible.

Since the student's early investigations will in all likelihood be more or less determinative of the subsequent trend

of his scientific activities, his subject for research is chosen with much care and, if possible, he is given several subjects during the course of his three years' work in the laboratory. In addition he is expected to make himself thoroughly familiar with the details of the investigations of his fellows in the laboratory.

Library Work. It is essential that the student shall acquire an adequate contemporaneous knowledge of the entire field of chemistry. This can be done only by reference to the original literature, both past and current. He is expected, therefore, to devote a considerable portion of his time to familiarizing himself with the journals, periodicals, and other important sources of information available in the Library. The various courses are given in such manner as to lead the student on in this direction.

FACILITIES

Laboratories. The Chemical Laboratories occupy the third floor of one wing of the Science Building. The floors below are occupied by the Collegiate Department of Chemistry. In addition to store rooms, offices and the Directors' Laboratory, room is provided for nine investigators. Not more than two students are assigned to one laboratory.

Owing to the crowded condition of the present quarters a new laboratory is in project which is to be completed and equipped by Oct. 1st, 1917. This will consist of a three story building approximately 43 x 69 feet, comprising seventeen individual research laboratories, together with shop, storerooms, offices and conference room.

In addition to the usual equipment of a chemical laboratory, the following apparatus may be mentioned as being available for research work: A special water still for "conductivity water;" a 2-kilo balance, sensitive to one-tenth milligram; a Hilgar quartz spectograph; a Pulfrich refractometer; a Leeds and Northrup conductance apparatus, including a bridge, air condenser, telephone, and oscillator, and two one hundred and eleven thousand ohm resistance boxes (Curtis's wound); a ten thousand ohm resistance box in steps of one-tenth ohm, a Leeds and Northrup New High Sensitivity Galvanometer, several less sensitive D'Arsonval Galvanometers, a Leeds and Northrup Potentiometer, a platinum resistance thermometer together with bridge, several large capacity vacuum pumps giving pressures as low as 0.00005 mm., thermostats, motors, vacuum jacketed tubes, McLeod gauges, etc.

Through the courtesy of the American Academy, there has been placed at the disposal of the Department a specially constructed assay balance sensitive to one one-thousandth milligram provided from the Warren Fund and an automatic refrigerating machine provided from the Rumford Fund.

The Department is provided with a laboratory shop which includes a grinding wheel and bench lathe with accessories, engine lathe, drill-press and a complete equipment of small tools. The Physics Department has a well equipped shop with a competent mechanician in attendance whose services may be arranged for when required. The laboratory shop is primarily intended to be used when its use serves to save time. The shop is also equipped with an oxy-acetylene welding outfit.

Since glass apparatus forms a large part of the necessary equipment for research, the laboratory provides a complete stock of glass tubing. This includes ordinary soda glass in all sizes, which is used chiefly for glass blowing exercises; a complete stock of lead glass employed in the construction of apparatus; a stock of special glass of coefficient 3.5×10^{-6}, which is employed in apparatus where the conditions of use are especially severe. In addition there is available an unusually good stock of transparent quartz tubing, as well as of electro quartz.

A complete stock of all ordinary supplies, such as stopcocks, stoppers, rubber tubing, quartz ware, etc., is always kept on hand.

The Department is always ready to purchase special apparatus or materials required for research work, while the equipment of permanent apparatus is constantly being added to.

THE LIBRARY. The library facilities which the University affords to students in chemistry are the best obtainable. Complete sets of journals and periodicals are kept on file, together with text books, treatises, etc. New books are placed on display on the library tables and such as are of value are ordered on request.

The student has free access to the shelves and files. Tables are assigned in proximity to the book shelves where the student may leave permanently books and papers with which he is engaged. A more detailed description of the library facilities will be found elsewhere.

SCHOLARSHIPS AND FELLOWSHIPS

A considerable number of scholarships and fellowships are available for students in this Department under conditions set forth elsewhere.

DOCENTS AND HONORARY FELLOWS

Docents and Honorary Fellows are appointed under the conditions as set forth elsewhere. The Department welcomes such men as have already obtained their Doctor's degree and who for one reason or another wish to devote themselves for some time to research work. Every facility and encouragement will be afforded such men for the furtherance of their work.

MASTER OF ARTS. The formal requirements for this degree do not necessarily include an original investigation on the part of the candidate. However, the candidate must demonstrate that he possesses a working knowledge of the fundamental elements of the Science of Chemistry. Obviously, in the case of a science so largely founded on experimental facts as is chemistry, the power to carry on an experimental investigation constitutes one of the most simple and direct means for demonstrating that the candidate possesses the necessary scientific qualifications for this degree.

DOCTOR OF PHILOSOPHY. The formal requirements for this degree are given elsewhere. Among other things, they include three years of residence (or its equivalent in other institutions), with attendance on lectures, and the successful completion of an investigation which constitutes a contribution to the Science of Chemistry. The requirements for a degree cannot, however, be fulfilled by merely observing the formal requirements as to residence, attendance on lectures, and the like. On the contrary, while all formal requirements must be scrupulously fulfilled, to receive the degree of Doctor of Philosophy, the candidate must clearly demonstrate that he possesses those scientific attainments which are essential to an active and productive scientific career.

IV. BIOLOGY

The work of the biological department has reference chiefly to the problems of general physiology, *i.e.*, problems dealing with or bearing upon the peculiarities of vital processes as such. In modern physiology living organisms are regarded as material systems having special and highly distinctive characteristics which are subject to analysis by the methods of the exact sciences. The problems presented by the living cell—a system consisting largely of colloidal material and distinguished by the possession of metabolism and other unique peculiarities—are most effectively approached from this point of view, and fundamental progress in general physiology has been due chiefly to the application of the sciences of physics, chemistry and physical chemistry to the analysis of the vital processes. The biological department offers instruction and facilities to those interested in the application of the physical and chemical sciences to the problems of general physiology. Students and investigators in this field will find unusually good opportunities for gaining the requisite knowledge of physics, chemistry and especially physical chemistry, and every effort will be made to correlate their work in these departments with their physiological work. Students of the physiological analysis of the reactions and behavior of normal intact organisms are offered the further advantage of coöperation with the department of psychology. Work in the physiology of development, comparative physiology, general pharmacology and other fields of research in which marine animals are especially valuable may be conducted during the summer at the Marine Biological Laboratory at Woods Hole under

the direction of Professor Lillie, and credit for work done at Woods Hole will be given in Clark University.

The laboratory is equipped with the usual apparatus and materials for work in general physiology. Any additional apparatus, animals or chemical reagents required for the purposes of any special research will be provided wherever possible. The conditions are especially favorable with regard to scientific literature. Complete files of nearly all of the important journals in zoölogy, physiology and biological chemistry are in the library, as well as a large number of special works in these sciences, and literature in other biological fields (botany, medicine) can be procured on short notice.

For admission to the laboratory students should have had adequate previous training in biology, chemistry and physics. Resident men students whose preparation in these subjects is insufficient may remove these deficiencies by taking the courses offered in Clark College. Students desiring to attend lecture courses without taking laboratory work can make special arrangements to do so.

The following courses are offered:

1. Fundamental Problems of General Physiology. This course is introductory and will deal chiefly with the physiology of the living cell from a physico-chemical point of view. The subject matter will be divided somewhat as follows: The distinctive characteristics of living as distinguished from non-living matter; chemical composition of the cell; enzyme action; the physico-chemical constitution of the cell; the nature and significance of cell-organization; the importance of the colloidal state in physiological processes; the rôle of electrolytes; the physiology of stimulation, contractility, and related processes; the general reactions and elementary behavior of intact organisms (tropisms, etc.); the general characteristics of metabolic processes (oxidations, syntheses, interchange with surroundings); cell-reproduction, fertilization, development and heredity. Dr. Lillie, *two lectures weekly, October to June.* Students with sufficient preparation will be assigned laboratory work in connection with these topics.

2. Special Problems of General Physiology. A more advanced

course of lectures will be given on topics of general physiology, having especial reference to the problems under investigation in the laboratory. Hours will be arranged to suit requirements. DR. LILLIE, *October to June.*

3. BIOLOGICAL SEMINAR. The Seminar will meet once a fortnight to present results of research and to review and discuss recent literature. *October to May.*

4. SPECIAL TOPICS IN BIOLOGICAL CHEMISTRY. The aim of this course is to present in greater detail than is usually possible in a more general course, certain subjects of particular interest to students intending to undertake biochemical research. The subject at present offered is organic chemistry with especial reference to compounds and processes of biological interest. The discussions will include the physical and chemical properties of such compounds, their metabolism, and general physiological significance. DR. WHITE. *One lecture weekly, October to June.*

5. GENETICS. A course of one lecture weekly on the methods and problems of genetics is given throughout the year. The data of heredity and variation, the bearing of these data on the problems of evolution, theories of heredity, Mendelian inheritance and its cytological basis, are reviewed in the course. DR. HURLIN. *October to June.*

6. THE PHYSIOLOGY OF MARINE ORGANISMS. The course in General and Comparative Physiology, given in the summer at the Marine Biological Laboratory at Woods Hole under the direction of Dr. Lillie, is also open to properly qualified students in Clark University. Those prepared to do so may undertake research in this field. For further information regarding the work at Woods Hole students are referred to the Annual Announcement of the Marine Biological Laboratory.

V. PSYCHOLOGY

A complete course in Psychology at Clark University includes the following subjects:

1. Anatomy and Physiology of the Brain and Spinal Cord, sense organs, and other parts of the body, especially the muscles—the organs of the will—in so far as they are concerned with mental processes—together with a good general background of biology. For this a special laboratory is equipped.

2. Physiological and Experimental Psychology, including an outline of the anatomy and physiology of the central nervous system and sense-organs; the elementary sense-experiences; sensation and perception; the measurement of sensational intensity; space; time; reaction-times; affection and emotion; memory; association; attention; apperception; will; the "higher mental processes;" inter-relation of mind and body. For this a special laboratory is equipped.

3. Comparative and Genetic Psychology. Review of the general doctrine of evolution as a basis for the evolution of mind. Discussion of experimental and observational studies upon typical forms of animal life, beginning with the protozoa. Instincts; animal and human infancy. Childhood and adolescence.

4. Abnormal and Morbid Psychology, as nature's experiments, *e.g.*, border-line phenomena as seen in neurotic subjects, prodigies, and geniuses; defectives, such as the blind, deaf, criminal, idiotic; mental and nervous diseases, epilepsy, phobias, neurasthenia, hysteria; morbid modifications of will, personality and emotion, etc. Special clinical facilities for this work are open to the department in the hospitals and other institutions of the city.

5. History of Psychology and Philosophy, including the chief culture institutions, science, medical theories, Christianity, and education generally.

6. Applications of Psychology, Pedagogy, including mental and moral hygiene and regimen, school organization and methods from kindergarten to university; the sex problem; defectives, etc.

7. Psychoanalysis. Freud, Janet, Jung, Adler and others. The mechanisms are considered less in their applications to sex than to fear, anger and other emotions. The psychoanalysis of great men. Dreams, hypnotism, multiple personality, somnambulism, and the more common forms of neuroses and psychoses, the psychology of everyday life.

The aim of the Psychological Department is to cover this field as well as its instructors are able to do so in two or three years.

The following courses are announced for the academic year 1917–1918.

DR. HALL'S COURSES

Dr. Hall's courses are as follows:

1. The Psychology of the Feelings and Emotions. This course will involve a brief sketch of the history of the theories in this field and a much more extended account of the recent experimental, clinical and genetic work done in this department. The purpose of the course is to give a clear account of the present condition of our knowledge of each of the feelings, one after another, pleasure and pain, fear, anger, sympathy, jealousy, love, hate, etc.

2. Psychogenesis. This course will begin with an account of the theories of the origin both of life and of mind, with chief emphasis upon the latter. There will be a survey of the results of experimental biology, concerning elemental life or substances that resemble it, then experiments and observations upon the simplest organisms. This will be followed by a résumé of our knowledge of certain typical forms of animal instinct up the series, and upon this basis the contributions to paleontology will be drawn upon and certain lessons as to the development of the instinct of type forms of life; the horse, camel, monkey and other typical forms will be dwelt upon at some length. This will be followed by a brief account of culture stages of the human race from the paleolithic age and that of the troglodytes up.

3. The Psychology of Religion. This falls into two halves:—first, the origin of religion, from animism and manaism up to the ethnic religions other than the Hebrew and Christian; the latter, focussing in the psychology of Jesus, constituting part two.

4. The Psychology of Appetite, Foods and Nutrition.

5. STUDIES IN HUMAN CHARACTER. This course begins with a consideration of current tests, scales, standards, and passes on to the higher qualities of man and the problems of race, sex, genius, talent, and the more or less systematic attempts that have been made to analyze and compare the original powers of man.

6. SOME VITAL PROBLEMS IN EDUCATION. This course will be given Saturdays for teachers and the special field it covers will be announced later.

7. THE SEMINARY, at Dr. Hall's house, three hours every Monday evening through the year.

8. Researches with individuals on special topics.

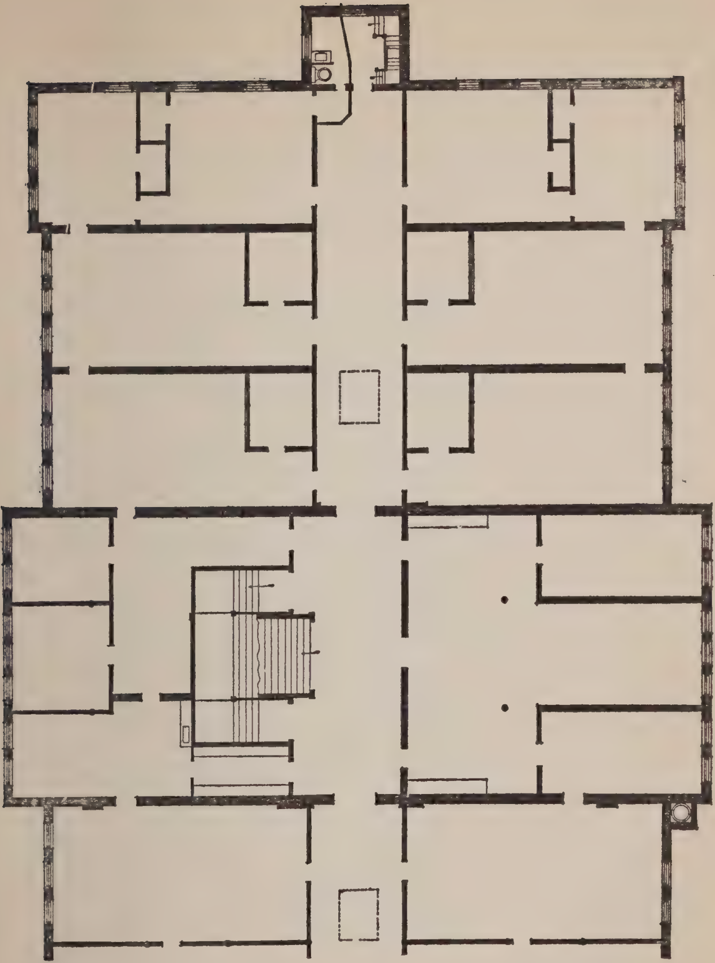
EXPERIMENTAL PSYCHOLOGY

The primary purpose of this department is to train students for the investigation of psychological problems. The lecture courses and the Journal Club aim to familiarize the student with the history and the present status of psychological experimentation; the laboratory courses are arranged with a view to training him in experimental procedure, and equipping him for independent research.

LABORATORY

The psychological laboratory occupies a suite of twenty rooms on the upper floor of the main building of the university. These rooms, as at present arranged, are devoted to the following purposes: office, lecture-room, seminary-room, reading-room, dark-room, work-shop, general apparatus-room, and a group of rooms for research.

The laboratory is well equipped with general apparatus; and it has an annual appropriation sufficient to provide for the purchase and manufacture of such apparatus as is required from time to time for special investigations. The workshop contains power- and other lathes, a power-drill, and an abundant equipment of tools and materials for the manufacture and repair of apparatus. The services of an expert



PSYCHOLOGICAL LABORATORY

mechanician are available; and every facility is provided for the devising and constructing of apparatus appropriate for the solution of such special problems as are undertaken.

The library contains an unusually large collection of psychological literature. It is especially well supplied with scientific periodicals and reports of the proceedings of learned societies. Since the enrolment of the department consists exclusively of graduate students, and is, therefore, relatively limited in numbers, it is possible to give to each student of the department a maximum of freedom in the use of the library. Besides having access to the university library, students of the laboratory have at their disposal an excellent working-library of psychological books and periodicals which are shelved in the seminary-room.

The more general and fundamental courses of lectures in the department are repeated each year, while the more advanced and specialized courses are given only in alternate years. A feature of the method of instruction at Clark University is the frequent informal conferences between instructor and student. The Journal Club meets weekly (two-hour sessions) for the discussion of the current literature. The more valuable contributions presented by the members of the Club will be published in the *American Journal of Psychology*. The laboratory work includes an introductory course, an advanced course, an experimental course in statistical methods, and a research course. The former is designed to familiarize the student with the efficient handling of apparatus, and to acquaint him with the methods to be followed and the precautions to be observed in psychological experimentation. This course is repeated each year; it, or its equivalent, is a prerequisite to all other work in the laboratory. The advanced laboratory course is intended to supplement the introductory course; and the course in statistics aims to give to the student a working knowledge of statistical methods. The research varies from year to year.

Provision for Comparative Psychology is now made at the Hadwen Arboretum, about fifteen minutes' walk from the main building of the University, where special facilities for the care of the animals have been provided.

DR. BAIRD'S AND DR. FERNBERGER'S COURSES

1. GENERAL PSYCHOLOGY. A course of lectures and demonstrations dealing with sensation, affection, attention and perception. This course will present, in concrete and systematic form, the more important facts that have been yielded by the experimental investigation of the simpler mental processes, together with a discussion of theories that have been advanced from time to time. DR. FERNBERGER. *Two hours a week. First semester.*

2. THE NEUROLOGICAL BASIS OF PSYCHOLOGY. An elementary course dealing with the anatomy and physiology of the central nervous system and the organs of special sense. The work will be covered partly by lectures and partly by actual dissection. The central nervous system will be considered from the functional aspect as well as a consideration of the gross and microscopic anatomy. DR. FERNBERGER. *Two hours a week, January to April.*

3. THE APPLICATION OF STATISTICAL METHODS TO PSYCHOLOGY. A course of lectures and demonstrations in which will be considered the calculations necessary for the practice of the psychophysical methods and also the relation between the methods. The distribution of relative frequencies, correlation and similar topics will also be considered. DR. FERNBERGER. *One hour a week. First semester.*

4. LABORATORY WORK IN PSYCHOLOGICAL STATISTICAL METHODS. In this course a limited and selected group of students will be given practice in the actual calculations and in the acquiring of the data that will form the basis for these calculations for the different methods discussed in Course 3. DR. FERNBERGER. *Two or three hours a week. Second Semester.*

5. THE PSYCHOLOGY OF LANGUAGE. A course of lectures dealing with an analysis of the language function, with special reference to the study of the aphasias. In this course will also be considered the anatomical basis of language, the origin of language ontogenetically and phylogenet-

ically considered, as well as such special topics as the psychology of reading. DR. FERNBERGER. *One hour a week. Second Semester.*

6. THE PSYCHOLOGY OF MEMORY, IMAGINATION AND THE PROCESS OF LEARNING. Lectures and demonstrations dealing with the phenomena of mental acquisition and retention; imagery, association and reproduction, the phenomena of learning and forgetting, the function and development of habits. DR. BAIRD. *Two hours a week. Second semester.*

7. THE PSYCHOLOGY OF THE HIGHER INTELLECTUAL PROCESSES. The psychology of meaning, abstraction, thought, judgment, reasoning; the function and significance of imagery; the phenomena of *Bewusstheit. Bewusstseinslage*, *Aufgabe*, *Einstellung* and *determinierende Tendenz.* DR. BAIRD. *One hour a week.*

8. HISTORY OF PSYCHOLOGY. An outline of the development of psychological thinking; a statement and discussion of the characteristic features of the systematic doctrines embodied in the writings of representative psychologists, past and present. DR. BAIRD. *One hour a week.*

9. GERMAN TRANSLATION. A course for the rapid reading of a German psychological text. DR. BAIRD. *One hour a week.*

10. COMPARATIVE PSYCHOLOGY. A description and discussion of investigations of animal learning. DR. BAIRD. *One hour a week.*

11. JOURNAL CLUB. A seminary for the informal discussion of current psychological literature. Meetings are held weekly throughout the year.

12. INTRODUCTORY EXPERIMENTAL COURSE. In this course the student will perform a series of standard psychological experiments, chiefly for the purpose of mastering the technique of experimentation. The course will be given by Dr. Baird, Dr. Fernberger and Mr. Teachout. *Four to six hours a week, throughout the year.*

13. ADVANCED EXPERIMENTAL COURSE. The object of this course is to acquaint the student with the technique of some of the more complicated apparatus used in psychological experiments. The use of the plethysmograph, pneumograph, ergograph, tapping experiments, methods of time measurement, methods of presentation of material and the like will be investigated. The student will also become acquainted with all of the special apparatus in the possession of the laboratory. DR. FERNBERGER. *Two hours a week. First semester.*

14. RESEARCH COURSE. Under this title are grouped the special investigations undertaken by students in the laboratory. *Topics and hours to be arranged.*

DR. KARLSON'S COURSES

1. History of Philosophy. The work in philosophy at Clark University is essentially limited to a thorough, though introductory, course, including lectures and texts covering the entire history of philosophy from Thales to Schopenhauer, both inclusive, as fully as can be done in two hours a week. The instructor makes no attempt to teach systematic philosophy, logic, ethics, metaphysics, psychology, or any of the special disciplines, and deals with the history of philosophy in the sense of Zeller, Fischer, Ueberweg, and the rest, in the historic spirit, with some biographical matter, teaching the chief opinions of each important man and then passing to another, and not stressing any of the above specialties. The idea is that the historian should be metaphysician, logician, ethicist, epistemologist, psychologist, etc., just as much as was the man whose system he is expounding for the time, chiefly finishing one author before passing to another, following largely the chronological order, and teaching each system more as literature than as dogma, avoiding indoctrination, and teaching every doctrine or view sympathetically, letting the systems criticize each other, and in general reserving his own criticisms until after his sympathetic presentation has been made, and striving to fit for our examination in such a way that we can plan ultimately to require this course of all who take degrees in psychology or education. *Two hours a week.*

2. Contemporary Philosophy. A discussion of the philosophy since Schopenhauer, dealing chiefly with the Naturalistic, the Idealistic, the Pragmatic, and the Realistic tendencies in present day philosophy. Special emphasis is laid on the philosophy of such men as Haeckel, Nietzsche, Eucken, James, Bergson, etc., and an evaluation of their philosophy is attempted. The relation between philosophy and present day science is also discussed. *One hour a week.*

DR. PORTER'S COURSES

Course in Mental Evolution and Comparative Psychology. Lectures on reflexes, tropisms, instincts, habit-formation, the learning process, and other mental processes in animals. Especial emphasis will be placed on methods of experimental investigation and interpretation of results. The facts and laws of animal behavior and the relation of these to the various branches of human psychology, and other social sciences will be discussed. Some attention will be given to the applications of the findings of the study of Animal Behavior to

Nature Study. Lantern slides, charts and demonstrations with apparatus with animals and human subjects. *One hour a week. First semester.*

COURSE IN SOCIAL PSYCHOLOGY. Discussions of the rapidly increasing contributions to our knowledge of reflexes, instincts, and conditions of learning in so far as these explain and point to the practical control of social forces and institutions. The results of investigations of individual psychology are made to contribute to the understanding of the behavior of the same individual when he is a member of a group. The chief sources used are: Thorndike's Original Nature of Man; McDougall's Social Psychology; Wallas' The Great Society; Ross' Social Psychology, and Trotter's Herd Instinct in Peace and War.

The following courses offered by Professors James P. Porter and L. R. Geissler in Clark College are open to students in the University:

1. GENERAL PSYCHOLOGY. Three hours a week, throughout the year.
2. SOCIAL PSYCHOLOGY. Three hours a week, throughout the year.
3. EDUCATIONAL PSYCHOLOGY. Three hours, first semester.
4. LABORATORY COURSE IN EXPERIMENTAL PSYCHOLOGY. Three hours a week, throughout the year.
5. ADVANCED PSYCHOLOGY. Attention, feeling, emotions and will. A lecture and seminar course. Three hours, throughout the year.

At the Hadwen Arboretum, where a "station for the study of animal behavior" has been established and is now under Dr. Porter's direction, are found facilities for the study of certain forms of animal life; and here too will be found some of the illustrative material for his lectures.

PSYCHIATRY

Dr. Cowles, lecturer on Psychiatry, former head of the McLean Hospital at Waverley, Mass., will give a course at the University and the Worcester State Hospital for the Insane. Dr. Cowles's course includes the following topics with clinical demonstrations.

THE MELANCHOLIA-MANIA GROUP OF NEUROPSYCHOSES:

1–2. The dependence of Psychiatry upon Mental and General Physiology; the concept of energy fundamental; the reflex arc and integrative action of the nervous system. Relation of inhibition to anabolism, and katabolism.

3. Conduction-paths and Threshold Values: changes in physiological conditions in relation to the determination of psychical effects—normal habit—overuse and disuse—mental symptoms.

4. The Physiology and Pathology of Emotion; depression and exaltation figurative expressions in psychology, both being excitative and katabolic; relations of feeling-tone to conditions of ill-being.

5. Psychasthenia and Neurasthenia; the minor psychoneuroses—psychological automatism, fixed ideas, hysteria.

6. Mental Symptoms of Nervous Exhaustion; their genesis in reductions of functional capacity of the nervous and mental mechanism.

THE DETERIORATING PSYCHOSES:

7–10. Involution psychoses, paranoia. Dementia praecox, general paresis, senile dementia.

VI. PEDAGOGY

This department offers a course which can be taken for the degree of Doctor of Philosophy. Its work is in the closest connection with that of psychology and anthropology, and in part based on these subjects. The work in this department is intended to meet the needs of the following classes of students.

First. Those intending to teach some other specialty but who wish a general survey of the history, present state, methods, and recent advances in the field of university, professional and technical education.

Second. Those who desire to become professors of pedagogy, or heads or instructors in normal schools, superintendents, or otherwise to become experts in the work of education.

The programme of the Pedagogical Department includes courses or part-courses upon the following subjects:

1. (*a*) CHILD STUDY. (*b*) PEDAGOGICAL PSYCHOLOGY. (*c*) EXPERIMENTAL PEDAGOGY. (*d*) SCHOOL HYGIENE.

2. (*a*) PRINCIPLES OF EDUCATION. (*b*) HISTORY OF EDUCATION AND REFORMS. (*c*) METHODS, DEVICES, APPARATUS, ETC.

3. (*a*) ORGANIZATION OF SCHOOLS IN DIFFERENT COUNTRIES. (*b*) PROBLEMS OF COLLEGE EDUCATION. (*c*) THE TEACHING PROFESSION. (*d*) MOTOR EDUCATION, including manual training, physical education, etc. (*e*) MORAL AND RELIGIOUS EDUCATION. (*f*) IDEALS.

The courses in pedagogy for 1917-1918 will be as follows:

DR. WILLIAM H. BURNHAM'S COURSES

A. HYGIENE OF THE SCHOOL CHILD. This course has been given in alternate years with the course on the Hygiene of Instruction. Some of the more important chapters in modern school hygiene will be considered, including such topics as: The conditions that determine growth and development. Physiological age. The physical and mental differerences between children and adults. The general principles of somatic and mental hygiene. The hygiene of the senses. Modern studies of defects of sight and hearing. School diseases. The hygiene of the voice, the mouth, the teeth, the nose. Tests of ability to work and of physical condition. Medical inspection. The hygiene of discipline. The development of habits of healthful mental activity. The hygienic aspects of recent psychological studies. Problems in mental hygiene and the hygiene of instruction. *One hour a week, throughout the year.*

B. PRINCIPLES OF EDUCATION. This course treats certain fundamental educational principles and involves also a study of several important chapters in the history of education, with a brief account of a few representative educational systems. Such topics as the following will be included. Educational ideals. The dominant aim at different stages of development. The correlation of educational forces. The family and education. The church and education. State aid and control. The field of scientific study in education. Antithetic educational principles. The history of nature versus convention in education. Rousseau. Pestalozzi as "pedagogical socialist." Modern *Sozial-Pädagogik*. Present problems and tendencies. *One hour a week, throughout the year.*

C. SEMINARY. The work will be determined in part by the needs of the students who elect this course. It is hoped that each student will select, after consultation with President Hall and Dr. Burnham, a topic for special investigation. The results of such studies may be published. During the year 1917-18, the work will probably be chiefly in the field of child psychology and child hygiene. *One or two hours a week, throughout the year.*

PRESIDENT G. STANLEY HALL'S COURSE

SOME VITAL PROBLEMS IN EDUCATION. See special circular later.

DR. EDMUND C. SANFORD'S COURSE

During the year 1916-17 Dr. Sanford lectured on THE COLLEGE AND THE COMMUNITY. The course treated first in outline the history of Higher Education in Classical Times, then the history of selected institutions in the United States and the effect of the Morrill Act. The concluding lectures of the course were devoted to the present day criticisms of American Higher Education and the demands which may properly be made upon it. *The section meets one hour a week during the first half 1916-17.*

The topic of the course for 1917-18 will be *The College Student as Material for College Training.* The course will begin with a sketch of the psychology of later adolescence; will consider college life and customs, the college man as a student and who should go to college; and will conclude with inferences as to what constitutes proper preparation for college and an outline of the distinctive features of college pedagogy. *One hour a week, first half year.*

The courses as announced above may be modified somewhat as the needs of the students or other circumstances may require.

THE CHILDREN'S INSTITUTE

The Children's Institute, under the auspices of the Educational Department of Clark University, provides lectures each year, in the small lecture-room on the second floor of the new wing of the library building, from nine to ten o'clock on Saturday mornings, open not only to students but to all others interested. This work varies from year to year. During the present academic year Dr. Amy E. Tanner has lectured upon Child Study.

The Children's Institute has a large hall with three adjacent rooms, comprising one entire floor in the new Library Building devoted to an educational museum, which is equipped with hundreds of maps, charts, diagrams, illustrative and other apparatus gathered from many countries, to ease the work of teaching and make it more effective. This material is used in various departments, but especially by that of Education.

Special attention has been given to the collection of the circulars and other publications of nearly one hundred types of child welfare organizations with which the department seeks to keep in touch.

The library of the department has a large collection of EDUCATIONAL LITERATURE, being especially rich in German and French literature, and having a large number of official reports from various countries—English, French, German, Belgian, Swedish, etc.; also town and city reports, and reports of special institutions; and a collection of French, German, and American text-books.

The books are arranged under the following heads:

1. GENERAL.
2. HISTORY OF EDUCATION.
3. EDUCATIONAL SYSTEMS.
4. THE THEORY OF EDUCATION AND SPECIAL SCHOOL SUBJECTS.
5. EDUCATIONAL PSYCHOLOGY.
6. CHILD STUDY.
7. SCHOOL HYGIENE AND PHYSICAL EDUCATION.
8. TEXT-BOOKS.
9. MISCELLANEOUS.

Many of the more common educational books are accessible in the Worcester Public Library and have not been duplicated by the University. The large collection of educational text-books in the library of the American Antiquarian Society and its valuable historical material are also accessible to the University.

The collection of educational periodicals includes a large number of the best foreign journals—English, French, German, Swedish, etc.

The nucleus of an educational museum has been formed. This is now merged with the museum of the Children's Institute, and contains a valuable collection of educational apparatus, pictures, illustrative material for language lessons, *Anschauungsunterricht*, toys, kindergarten material, maps, charts, diagrams, text-books, lantern slides, photographs, and illustrative material of various kinds in school hygiene, history, arithmetic, language, the natural sciences, etc. One room contains a collection of apparatus for the teaching of arithmetic, abacuses of various kinds, charts for counting, reckoning machines, number tablets, weights, measures, geometrical models, and astronomical charts and apparatus. Another room contains a collection of toys from different countries, a number illustrating scientific principles in physics and the like. A third room is devoted to apparatus and illustrative material in school hygiene. The collection includes seats and desks, charts illustrating good and bad posture, hygrometers, apparatus for ensuring cleanliness, for testing the air, charts illustrating the incidence of school diseases, the effects of antitoxins, etc., and a collection of the antitoxins for the various diseases. The main room is largely filled with pictures, models, maps, charts, and illustrative material for teaching the different school subjects and the different sciences. During the year 1915–16, 400 charts, 800 lantern slides and 50 books have been loaned to teachers and students. The catalogue of the department of school hygiene in the museum has been published. A catalogue of the toys has been prepared but not yet published. This Museum is open to teachers, students, and the general public at definite times. It is now under the direction of Professor W. H. Burnham.

The *Pedagogical Seminary* is a journal issued at the University, and serves as a convenient medium of publication for special investigations undertaken in the department.

VII. SOCIOLOGY

The courses here outlined indicate the scope of the work offered. At least two hours work per week and a seminar are given each year. Courses 2, 3, and 5 were given in 1916–17.

Dr. Hankins offers the following courses:

1. History of Social Theories. A survey of the main contributions to sociological literature beginning with Auguste Comte. A partial list of the writers covered in 1915–16 is: Comte, Buckle, Bagehot, Spencer, Novicow, Worms, de Greef, Gumplowicz, Kropotkin, Oppenheimer, Small, Ratzenhofer, Ward, Giddings, Durkheim, Sumner, Boas, Ross, Cooley, McDougall and Ellwood. Each author is taken up in turn and his viewpoints and principles analyzed and discussed. *Two hours per week.*

2. General Sociology. A series of lectures dealing with social origins and evolution and sociological analysis. Topics treated include the origin of man, of races, and of society; primitive ideas; religion, its origin, evolution and function; the family; tribal society; the state; philosophies of history. The analysis of social factors treats the physiographic, biological, economic and psychological bases of society and such special processes as natural and artificial selection; communication; coöperation; competition; differentiation; socialization. *One hour per week.*

3. Problems of Population. Considers various laws of population as developed by Malthus, Spencer, Nitti and others; vital statistics, birth and death rates, heredity and selection with some attention to statistical methods; theories of racial decay; eugenics and race-regeneration; and biological and sociological conditions affecting the supply of genius. Lectures, reports, discussions. *One hour per week.*

4. Problems of Social Reconstruction. The development of the philosophy of individualism and *laissez-faire* as related to its historical conditions is sketched, its statement by Smith, Bentham, Mill and

Spencer is analyzed, and its bearings and limitations considered. A discussion of the theories of justice is followed by a treatment of various special problems, such as minimum wage, unemployment, and the distribution of wealth and income, and the basis and limitations of the movement toward collectivism. *One hour per week.*

5. ELEMENTS OF STATISTICAL METHOD. A course designed to familiarize the student with present methods of handling quantitative data in social science with special reference to various kinds of averages, and measures of dispersion and of correlation. *Two hours per week.*

6. JOURNAL CLUB. Given to reports on theses and selected portions of the current literature. Special attention is given to the periodical literature dealing with population questions or with some phase of sociological inquiry. *One hour per week.*

Dr. Calhoun offers the following courses:

1. THE SOCIAL HISTORY OF THE AMERICAN FAMILY. After a brief survey of European origins and of the colonial period the major portion of the course is given to an exposition and interpretation of the evolution of the family in the United States. Causal connections with other social institutions and with environmental conditions are traced. Special attention is given to the influence of economic evolution and to the consequent outlook for the future. *One hour, first half-year.*

2. SOCIAL CAUSATION, a Critique of the Economic Interpretation of History. This course sets forth the present status of sociology in respect to scientific validity, stresses the importance of a correct formulation of the social forces, classifies the main human interests, analyzes and appraises various interpretations of social evolution, and in particular undertakes an exhaustive criticisim of the economic interpretation. *One hour, second half-year.*

3. SOCIAL RELATIVITY. This course illustrates by material selected from economic theory, sociologic doctrine, philosophy, religion, etc. the relativity of systems of thought and behavior. A beginning is made at an interpretation of the history of thought and of objective social institutions in terms of the general social environment. *One hour.*

Courses 1 and 2 are given during the year 1916-17.

VIII

HISTORY AND INTERNATIONAL RELATIONS

The distinctive feature of the Department is the new value it aims to emphasize in the study and teaching of history. Without neglecting scholarly investigation in the economic, political and social life of preceding centuries, it seeks to know the past primarily the better to understand the present; to learn from a study of their historical evolution how the various nations and races have developed the characteristics and culture which mark them today; to gain a sympathetic appreciation of the best in other civilizations; and to evaluate correctly the problems and the difficulties constantly arising in the international relations of the family of states. The field of history covered is not limited to the United States and three or four of the older nations of Europe, but includes as well the newer and rapidly developing states of Asia, Latin-America and Africa. Political development is regarded as of no greater importance than economic, social and religious advance.

ANNUAL HISTORICAL CONFERENCES

In carrying out these features of its work, the Department has arranged annual conferences for the discussion of the history and the present-day conditions of various lands. In 1909 the sessions dealt with the Far East, including China, India, the Philippines and Hawaii; in 1910, the Near East and Africa; in 1911, Japan and Japanese-American relations; in 1912, Recent Developments in China; in 1913, Latin America; and in 1915, the Problems

and Lessons of the World War. Altogether more than one hundred and seventy-five men have taken part in these conferences—university professors, anthropologists, leading natives, government officials, officers of the army and navy, travelers and missionaries—all of whom could speak with authority. The University students are enabled not merely to read the addresses and papers, which are issued in a series of bound volumes, but to listen to and meet these men who are both writing and making present-day history.

JOURNAL OF RACE DEVELOPMENT

The *Journal of Race Development* is another means for emphasizing present historical values. Published quarterly by the University, under the editorship of President G. Stanley Hall and Professor Blakeslee, assisted by a board of twenty-one contributing editors, the majority of them from the faculties of other Institutions, it has been a forum, during the past five years, for the discussion of the problems which relate to the progress of races and states generally considered backward in their standard of civilization. The *Journal* is of frequent service to the work of the Department, for it publishes from time to time articles and theses of advanced students, which show particular excellence.

COURSES

The various courses offered in the Department are so arranged, in cycles of two or three years, that students working for their doctorate will be enabled to secure a full program each year. Those taking History as a major are advised to elect their minor work in Sociology. In addition to the regular courses, a feature of the methods of instruction in the Department is the frequent informal conferences between instructor and student.

Professor Blakeslee offers the following courses:

1. United States History. Different periods are taken for intensive study in successive years. In 1914–15 the course dealt with the period from the close of the Civil War to the present time, and included the economic and social development of the country during these years as well as the history of politics. In 1915–16 it included the period from the formation of the Constitution to the Missouri Compromise. The present year, 1916–17, it extends from the Missouri Compromise to the outbreak of the Civil War, with emphasis upon the years following the Compromise of 1850. It treats especially the institution of slavery as it existed in the Southern States, the origin and growth of the abolition sentiment, the doctrine of states rights and the development of the antagonism between the North and the South till its culmination in the Civil War. A critical study is made of source material, as well as of the standard authors. The introductory lectures are followed by reports presented by students upon assigned topics. *Two hours.*

2. The Expansion of the United States. The history of the successive territorial acquisitions of the United States is traced, including the diplomatic negotiations and the relations with foreign powers. This is followed by a study of the constitutional questions involved, especially those regarding the status of newly acquired possessions and of present-day dependencies; the differences between incorporated and unincorporated territory; and the rights and privileges of inhabitants and citizens of the various lands considered. The aims and the continuity of the American Colonial policy are pointed out. *One hour.*

3. The History of American Diplomacy. This course will treat of the international relations of the United States from its beginning as an independent nation to the present day. It will trace the gradual development of American foreign policy, point out its distinctive features, and show how it has differed from the diplomacy of other countries. A familiarity with the standard books in the field will be expected, and frequent reference made to such source material as Moore's Digest and the Foreign Relations of the United States. *Two hours.*

4. International Law. The aim of this course is to give a knowledge of the general principles of International Law. So far as possible definite cases are studied, and for that purpose Scott's "Cases on International Law'' and Stowell and Munro's "International Cases" are followed. Especial attention is paid to the legal questions involved in the existing international controversies; to the

history of arbitration; and to the modifications in International Law introduced by the war and by such international Congresses as those held at The Hague. During the present year, the problems in international law arising from the war in Europe and from the relations of the neutral to the belligerent states, are being given the closest study. A number of the most important legal issues between the United States, Great Britain and Germany are argued, as in an international court. The leading authorities and the cases are supplemented by lectures and discussions. *Three hours.*

5. RUSSIA. The lectures discuss particularly the revolutionary movement, including the abuses of autocracy and bureaucracy, the character and methods of the revolutionists, the economic and political ability of the peasants, the widespread acceptance of socialism by the educated classes, the influence of the church, the recent reforms by the government and the influence upon the Empire of the present war. *One hour.*

6. THE FAR EAST. The lectures deal with Russia in Asia; Japan, with its colonies, Formosa and Korea; Manchuria, including the history and present status of the struggle for its control; China and the revolution; the Philippines and Hawaii; and the international politics of the Far East and of the Pacific Ocean. *One hour.*

7. BRITISH COLONIES AND DEPENDENCIES. A survey of the important political, economic and social conditions in the leading British possessions, especially in Canada, Australia, New Zealand, India and Egypt; and a discussion of British colonial policy and problems. *One hour.*

8. LATIN AMERICA. A survey of the history of the various countries is followed by a consideration of international diplomacy, political problems, systems of government, race questions, and economic and industrial conditions. Especial emphasis is placed upon the past and present relations, both in trade and diplomacy, between the United States and the countries of Latin America; this involves a careful study of the Monroe Doctrine. The lectures are based, in part, upon material which has been secured in a recent trip to South America. *Two hours.*

9. HISTORICAL SEMINAR. The students in the Department of History meet one evening a week in a seminar for the consideration of particular topics of historical interest and for the review of book and magazine material of especial value. Each member is expected to present reports which then form the basis for a general discussion.

The present year the Seminar is devoting much of its time to a consideration of diplomatic problems, especially those relating to the European war and those in which the United States is a party. A critical study is made of the diplomatic correspondence relating to the various international controversies.

The past year especial attention was given to a study of the development of Pan-Americanism.

During the year 1916–17, courses 1, 4 and 9 are given.

Dr. Gras offers the following courses:

1. THE ECONOMIC HISTORY OF EUROPE FROM 1300 TO THE PRESENT. The work in this course consists largely of oral reports. These are commented upon by the lecturer and made the basis of general discussion. Such topics as the following are studied: the origin of towns, the decay of the manor, the rise of a free tenant class, the revolts of 1381 and 1525, the enclosure movement; the Hanseatic League, Italian commercial supremacy, the formation of national companies, the struggle for a market, the history of prices; medieval crafts, the domestic system of industry, the industrial revolution; mercantilism, the free-trade movement, modern protectionism, national economic regulation. The object of the course is in part to familiarize the student with the literature on the subject. A reading knowledge of French and German is of great service. *Two hours.*

2. THE ECONOMIC AND POLITICAL HISTORY OF EUROPE SINCE 1789. Lectures are delivered on such topics as the French revolution, the Napoleonic régime, the proletarian upheavals, the industrial revolution, the history of trade unionism, socialism and syndicalism, the formation of the German Empire and of the Kingdom of Italy, the struggles of the papacy. *Two hours.*

3. THE HISTORY OF ENGLAND. From year to year special periods of English history are selected for intensive study (during the year 1915–16, the Tudor and Stuart periods). Although emphasis is placed upon insular developments, nevertheless the relation of English to general European history is regarded as an essential part of the work. *One hour.*

4. THE LITERATURE OF ENGLISH HISTORY: A Study in Historical Criticism. In this reading course in English History, the students discuss with the instructor the various works recommended for study, such as those of Green, Freeman, Stubbs, Froude, Gardiner, Von Ranke, Carlyle, Macaulay, Seeley and Lecky. *One hour.*

5. THE RENAISSANCE IN EUROPE. The history of the period 1250–1500 is studied as the close of the middle ages and the beginning of modern times, the chief interest centering in the economic, political, and artistic developments of the age. Considerable reading in contemporary sources and in modern works is required. Instruction is by means of lectures. *One hour.*

6. The Medieval and Modern History of Europe. Students meet the instructor in private conference at stated periods to discuss the reading of monographic and encyclopedic works. Assignments are made in accordance with the needs of individuals. This course is intended primarily for candidates for the doctorate, who are prepared to use the French and German as well as the English language. *One hour.*

Courses 1 and 5 are offered during the year 1916–17.

LIBRARY

The Library is under the control of a Library Committee, appointed by the Trustees, of which the President of the University is *ex officio* chairman. The duties of this committee are to advise concerning the arrangement, cataloguing, use of books, and other matters pertaining to the Library not reserved to the Trustees nor otherwise provided for.

LIBRARY COMMITTEE

PRESIDENT G. STANLEY HALL, *Chairman*
PRESIDENT EDMUND C. SANFORD
PROFESSOR WILLIAM E. STORY, *Secretary*

LIBRARY STAFF

LOUIS N. WILSON, *Librarian*

ASSISTANTS

EDITH M. BAKER, *Senior Assistant*
HELEN J. ELLIOT, *Cataloguer*

MARIAN F. CROSS
ETHEL S. MCCOY

MILDRED W. PAGE
LENA G. TOWSLEY

The Library building is situated on the corner of Main and Downing streets. The Public Opening of the building was held January 14th, 1904. A full description of the building and of the Proceedings at the Opening will be found in the *Publications of the Clark University Library* for April, 1904 (Vol. 1, No. 3).

The College Library and study rooms occupy the lower floor of the new building, opened in September, 1910, and described in the College Record, July, 1910, Vol. 5, pp. 185–187.

The Library contains over 80,000 bound volumes and pamphlets, and the reading-room receives over 500 journals.

The books are grouped as follows:

A	Works of General Reference
B	Journals
C	Mathematics
CD	Math.-Physics
D	Physics
DE	Physical Chemistry
E	Chemistry
F	Biology, Zoölogy, Botany, Physiology, Neurology
G	Geography
H	Pathology
I	Psychology
J	Philosophy
K	Religious Psychology
L	Biography
M	Anthropology
N	Education
O	General Science
P	History
R	Political and Social Science Economics
S	English
T	Modern Languages
U	Classics
W	Practical Arts
X	Library Science
Y	Art
Z	European War

Tuesday and Friday mornings, each week, all books recently added to the library are placed upon a table in the Reference section where they remain for three days. This affords the members of the University and College an opportunity to examine the new books in all departments before they are placed upon the shelves for circulation.

About once a month, during term, by the courtesy of our booksellers, new books are placed for inspection on one of the tables in the Reference section. Any member of the University or College may recommend the purchase for the library of books thus displayed, and such recommendation will receive prompt attention.

All books are classified by the heads of departments and particular attention is paid to the needs of students engaged in research work. The library already possesses a good collection of complete sets of the best scientific periodicals. It makes liberal purchases for individual needs and supplements these by drawing upon the resources of the older and larger libraries through the inter-library loan system. During the past year 476 volumes were borrowed from, and 730 volumes lent to, other libraries. The number of books added each year is about four thousand volumes.

The publications of the Library, edited by the Librarian, and begun in October, 1903, are as follows:

VOL. I

(1) Bibliography of the Published Writings of President G. Stanley Hall. (2) Bibliography of Child Study for the Year 1902. (3) Proceedings and Addresses at the Public Opening of the Library Building of Clark University, January 1904. (4) Bibliography of Child Study

for the Year 1903. (5) Preparing Manuscript for the Press. (6) Founder's Day, Clark University. (7) Bibliography of Child Study for the Year 1904. (8) The Probable Source of the Plot of Shakespeare's Tempest. (9) Public Opening of the Art Department of Clark University, Dec. 5, 1905.

VOL. 2

(1) List of Books and Pictures in the Clark Memorial Collection. (2) Bibliography of Child Study for the Year 1905. (3) A Few Titles in Child Study. (4) Proceedings at the First Annual Banquet of the New England Association of Alumni of Clark University, and at the Banquet of the Washington, D. C., Alumni Association, 1907. (5) Bibliography of Child Study for the Year 1906. (6) Bibliography of Child Study for the Year 1907. (7) The Outlook for Research (Founder's Day Address, February 1, 1911). (8) List of Papers in the Field of Religious Psychology Presented at Clark University. (9) List of Degrees Granted at Clark University and Clark College.

VOL. 3

(1) The Relative Legibility of Different Faces of Printing Types (2) Suggestions for a Model Private Library at Clark College. (3) Bibliographies on Experimental Pedagogy. (4) Further Suggestions for a Model Private Library at Clark College. (5) Bibliographies on Educational Psychology. (6) Representative Books in Child Study. (7) Twenty-Fifth Anniversary of Clark University, 1889–1914.

VOL. 4

(1) List of Degrees granted at Clark University and Clark College, 1889–1914. (2) Alexander Francis Chamberlain. In Memoriam. (3) Bibliographies on Educational Subjects—No. 3. (4) The Universities and Investigation. Address delivered on Founder's Day, February 1, 1915. (5) Bibliographies on Educational Subjects—No. 4. Experimental and General Pedagogy. (6) Directory of Alumni, Faculty and Students. Clark University.

VOL. 5

(1) Bibliographies on Educational Subjects—No. 5. (2) Report of the President and Departments, 1916.

The books in the Art Department are accessible on application to the librarian, but, by the terms of the Founder's will, they cannot be taken from the building.

All the privileges of the Library are open to all members of the University, and each member has direct access to every book and journal.

The Library is open from 8 a.m. to 6 p.m. each week day from Sept. 1 to July 1. During July and August it is open from 8 a.m. to 5 p.m. from Mondays to Fridays, and on Saturdays from 8 a.m. to 12 m. The library is closed July 4th, Thanksgiving Day and Christmas Day.

Outside the University are found:

The Library of the American Antiquarian Society, organized in 1812, and containing over 125,000 volumes, accessible to all members of the University.

The Worcester Public Library, containing 600 newspapers and magazines and nearly 200,000 volumes, has, in the past, to some extent supplemented the scientific publications purchased by the University, and all its privileges are accessible without charge.

The Library of the Worcester District Medical Society of about 12,000 volumes, is also free to all members of the University.

LIBRARY RULES

No loud talking is allowed in any part of the Library.

Every book shall be returned at the end of one calendar month from the time at which it was taken out, but may be called in at any time at the discretion of the Librarian.

Current numbers of periodicals shall not be taken out until they have been in the Library ten days.

All dictionaries, cyclopædias, and books of general reference are permanently reserved.

Reserved books and current numbers of periodicals, exempt from circulation, may be taken out after 5 p.m., but must be returned before 9 o'clock the next morning, excepting that such books and periodicals may be taken out Saturdays at 12 o'clock, and may be kept until 9 o'clock the next Monday morning.

Readers must not write nor make any mark upon any book, manuscript, map, or other property belonging to the Library.

Any breach of the above Rules will involve suspension of the Library privileges until personally restored by the Librarian. All such cases shall be laid before the Library Committee at their next meeting.

ART DEPARTMENT

In his last will and testament the Founder of the University bequeathed

> "the sum of $100,000, as an endowment fund for the Art Department of said University, and said sum is to be held and kept sacred and intact as a principal not to be used or expended under any conditions; but the income, interest or proceeds thereof shall be used only in putting and keeping said works of art or others given or obtained for said department in good condition and in taking care of them; and then if there is a surplus of the income of said fund left, I will and direct that it be used in the purchase of additional works of art or of such matters as will add to the usefulness and efficiency of said Art Department."

Under these conditions a large room has been furnished and equipped on the upper floor of the Library Building. Upon the death of Mrs. Clark, those of the Founder's collections that were deemed most suitable for this purpose were arranged and displayed in this room, together with his most valuable books, which, by the conditions of the will, cannot be removed from the building. A complete catalogue of these books and paintings has been published in the PUBLICATIONS OF THE LIBRARY, Vol. 2, No. 1.

A Curator and Custodian have been appointed by the Board (see page 108) and all the collections are now accessible to visitors. The Art Department is open daily (except Sundays) from 9 a.m. to 5 p.m.

Three portraits and one landscape painting have been added to the collection:

1909. Portrait of the late Carroll D. Wright, President of the Collegiate Department from 1902 to 1909, by the late Frederick P. Vinton of Boston. This painting was awarded the Temple Gold Medal at the 1909 Exhibition of the Pennsylvania Academy of Fine Arts.

1911. Portrait of G. Stanley Hall, President of Clark University, by the late Frederick P. Vinton of Boston.

1913. Landscape painting "Snowing" by Joseph H. Greenwood of Worcester.

1914. Portrait of Edmund C. Sanford, President of Clark College since 1909.

To commemorate the twenty-fifth anniversary of the University the Board of Trustees, early in 1914, commissioned Mr. Victor D. Brenner of New York to prepare a medal to mark that event. The medal is made of bronze and is three inches in diameter. On the obverse is delineated the head of President Hall, and on the reverse a beautiful allegorical group symbolizing the spirit of the University, and the legend,

> "Knowledge is proud that he has learned so much,
> Wisdom is humble that he knows no more."

Scale models of the buildings and the University grounds have been made by T. J. McAuliffe and Son of Worcester, under the direction of the architects, Messrs. Frost and Chamberlain.

During the past year pictures and cartoons relating to the European War have been purchased. The collection now numbers nearly 2000 items.

REGULATIONS

1. All requisitions for apparatus must be made through the Bursar's office upon printed blanks provided for that purpose and signed by a member of the staff.

2. So far as possible, orders for only the kind and amount of apparatus certain to be used during the year shall be placed; nothing shall be ordered for future years, and apparatus for research shall take precedence over that for teaching and illustration only.

3. Requisitions for repairs, furniture, plumbing and work about the buildings must be made through the Bursar's office in writing and with detail, and, when once passed upon, no change involving additional expense can be made in the requisition without the consent of the Finance Committee.

4. No unappropriated rooms and no part of the University grounds shall be used for any purpose, and appropriated rooms shall not be used for other purposes than the stated University work for which they were intended, without previous permission from the office.

5. Unless for special reasons, absence of instructors from their stated exercises or from town for two consecutive week days in term time should be announced at the office, and for longer absence permission should be obtained beforehand.

6. The Trustees desire that no Instructor, Docent, or

Fellow shall enter upon other engagements outside his proper work in the University of a kind or amount likely to lessen his full efficiency for science within the University.

7. Appropriations shall hereafter cover all apparatus and supplies of whatever nature for laboratories, for demonstration or illustration; all metal and carpenter work connected with the scientific activity of each department; and every form of special service. Appropriations, however, shall not hereafter cover orders for books or journals, which shall be submitted to the Library Committee.

8. The several appropriations made to individual instructors and others shall be the full and fixed limit of the liability of the University, to be on no account transcended; and for every excess over the appropriations, from whatever cause, the instructor making the order shall be personally responsible.

9. No order for any purpose shall be paid by the University, whether on appropriations or for general supplies, that has not passed through the Bursar's office.

10. The President, Professors, Assistant Professors and regular Instructors authorized by the Board to do graduate work, together with the Librarian, shall constitute the Faculty of the University. Its meetings shall be called and presided over by its President, or, in his absence, by a Professor whom he shall designate. The Faculty shall elect a Secretary and its records shall always be accessible to the Trustees. Its jurisdiction shall include all matters pertaining to the instruction, conduct and discipline of students, and such other duties as may be prescribed by the Trustees.

11. The President of the University shall make, at the October meeting of the Board, an annual report on the condition of the departments and their work during the year and shall have authority to require and receive from all Instructors and Officers of the University and Library such reports as he may deem necessary. A copy of these reports, including that of the Library, shall be deposited with the Mayor of the City.

12. The University Faculty shall have the oversight of all graduate work and shall recommend for the Master's, Doctor's and all other graduate degrees upon such terms, conditions, and forms as it may determine, and exercise such other functions and responsibilities as are not expressly assigned to the Trustees or to the Collegiate Department.

13. The Custodian of the Art Collection shall have general oversight over its room in the Library Building and its contents, together with their care and use, under the direction and control of the Curator. The Curator shall from time to time submit to the Trustees his recommendations for the purchase of additional works of art from the income of the Art Fund, based on and together with the opinions of experts as to their value and desirability. All such purchases shall be approved by the Board of Trustees, or by such a committee of their members as they shall appoint for that purpose.

14. The President of the University shall make an annual report to the Trustees of the action of the Library Committee, of which he is Chairman, and this report, if approved, shall be filed and preserved.

DEGREES CONFERRED

On June 15, 1916, the University conferred degrees upon the following persons:

MASTER OF ARTS

VERNON CHARLES ALLISON
Thesis: The reaction between tellurium and selenium and solutions of the alkali metals in liquid ammonia

JOHN EDWARD BENTLEY
Thesis: The psychology of conversion and the reconstruction of religious pedagogy

JAMES FURMAN BROOKS
Thesis: A correlation of plays and studies

ALICE MAY BURGESS
Thesis: The hand

FRED CHARLES CONLEY
Thesis: Sanitary school legislation

JAMES FRANCIS CONLIN
Thesis: Child labor and education

LOREY CLIFFORD DAY
Thesis: A study of the mental development of a child

CLARENCE HENRY ELLIOTT
Thesis: Studies in rationalism

HAROLD ALLEN FERGUSON
Thesis: A sociological survey of Provincetown, Massachusetts

CARROLL NEWMAN GIBNEY
Thesis: Marks and marking systems

NATHAN HOWARD GIST
Thesis: Religious conditions in the United States during the first half of the nineteenth century

ESTHER MAUD GREISHEIMER
Thesis: Sensitizing action of neutral salt solutions on voluntary muscle and its antagonism by calcium chloride

THOMAS HANCOCK

Thesis: Historic and psychologic aspects of the resurrection of Jesus

JAMES KING

Thesis: The miracles of Jesus

GERTRUDE EMMA KNEELAND

Thesis: Diplomatic relations between United States and Venezuela

SHINICHI KURIHARA

Thesis: A Study in children's reasoning

JOSEPH TWICHELL LANSING

Thesis: The present situation of the United States in regard to naval and military preparedness

HOWARD HALE LONG

Thesis: Acquisition of motor control

IVAN EUGENE MCDOUGLE

Thesis: A study of Lexington, Kentucky, from 1800 to 1820

WILLIAM BARNARD MOONEY

Thesis: The relations of higher schools to the secondary schools of the United States

CLYDE B. MOORE

Thesis: Some psychological aspects of war

VEAZIE WINTHROPE O'HARA

Thesis: American influence in the commerce and politics of China

HENRY COLE PARKER

Thesis: The conductance of aqueous iodic acid solutions

LEROY ELDEN PEABODY

Thesis: Continued fractions of the second order, with bibliography of continued fractions

CARROLL CORNELIUS PRATT

Thesis: Modern religious problems and their relation to college students

DAVID WEIMER RIAL

Thesis: The control of measles

FRANCIS ALOYSIUS RYAN

Thesis: Corporation schools

LAWRENCE SMITH

Thesis: Cromwell from a New England point of view

BENJAMIN LEWIS WAITS

Thesis: Fourier's method for the separation of the roots of an algebraic equation

John Thomas Ward

Thesis: The absolute adsorption of water vapor on glass surfaces

Alfred T. Ware

Thesis: The influence of the Quakers on democracy

William Edward Zeuch

Thesis: An investigation of the metal trade strike of Worcester, Massachusetts, 1915

DOCTOR OF PHILOSOPHY

James Mace Andress

Dissertation: Herder as an educator

Arthur Wallace Calhoun

Dissertation: The economic interpretation of history

Harold Randolph Crosland

Dissertation: A qualitative analysis of the process of forgetting

William Learned Dealey

Dissertation: Child welfare institutions as related to the school

Lucile Dooley

Dissertation: Psychoanalytic studies of genius

Baiten Hori

Dissertation: A contribution to the psychology of attention

Peysah Leyzerah

Dissertation: On the indeterminate linear inequality with irrational coefficients

Florence Mateer

Dissetation: Child behavior

Maurice Walter Meyerhardt

Dissertation: University organization and reform

Francis John O'Brien

Dissertation: The effect of mode of presentation upon the act of learning

Edward Bates Peck

Dissertation: An investigation of the reaction between antimony and solutions of sodium in liquid ammonia

Frederick Madison Smith

Dissertation: The higher powers of man

Mary Treudley

Dissertation: The United States and Santo Domingo

PUBLICATIONS

A Register and Official Announcement is issued each year in January or February.

In the years 1890, 1891, 1893, and 1902, the annual Report of the President to the Board of Trustees was printed.

A Summer School was held for nine years ending in 1903, and in such years a Summer School Programme was issued.

In July, 1899, the University observed its tenth anniversary, and published the following volume:

Clark University, 1889-1899. Decennial Celebration. 8 x 11 in., pp. 566. Published for the University. Price, $5.00. Contains the lectures delivered by Professors Picard, Boltzmann, Ramon y Cajal, Mosso and Forel at the Decennial Celebration, July, 1899; also reports by the heads of departments on their aims and ideals, with a list of past and present members of the University and the titles of their published papers.

Proceedings of the Child Conference for Research and Welfare. Conferences held at Clark University in the summers of 1909 and 1910. Vol. 1, 1909, 257 p., contains 48 papers on problems relating to child welfare. Vol. 2, 1910, 287 p., contains 34 papers, on similar subjects. The papers in Vol. 1 were reprinted from the Pedagogical Seminary for September and December 1909, but those in Vol.

2, with one exception, have not been printed elsewhere. Price $2.00 per volume in paper, $2.50 in cloth. LOUIS N. WILSON, Publisher, Worcester, Mass.

In connection with the celebration of the 20th anniversary of Clark University in September, 1909, conferences and lectures were held by the several departments to which distinguished scientists and educators in this and other countries contributed. Two volumes of these lectures have been published with the titles:

Lectures and Addresses Delivered before the Departments of Psychology and Pedagogy in Celebration of the 20th Anniversary of the Opening of Clark University. 175+80 pages. Price $2.00.

Lecturers Delivered at the Celebration of the Twentieth Anniversary of the Foundation of Clark University under the Auspices of the Department of Physics. 161 pages. Price $2.00.

JAPAN AND JAPANESE-AMERICAN RELATIONS, pp. xi, 348, New York: G. E. Stechert and Company, 1912, $2.50. Edited by Professor George H. Blakeslee. The volume contains twenty-two of the addresses delivered by the experts, both Japanese and American, who met at the Clark University Historical Conference, November, 1911. Each of the chapters deals with a distinct topic; together they cover progressively the field of what is both most interesting and most vital in the present national and international situation of Japan.

RECENT DEVELOPMENTS IN CHINA, pp. xi, 413, New York: G. E. Stechert and Company, 1913, $2.50. Edited by Professor George H. Blakeslee. These twenty-two addresses, given at the Clark University Conference, November, 1912, by Chinese and Americans who have a recent, intimate and authoritative knowledge of China, present the underlying causes of the Revolution, and the progress and

problems of the Chinese people in government, education, social welfare, industry and religion.

LATIN AMERICA, pp. xii, 388, New York: G. E. Stechert and Company, 1914, $2.50. Edited by Prof. George H. Blakeslee. Twenty-nine addresses given at the Clark University Conference, November, 1913.

These addresses, by well-known authorities upon Latin-American affairs, including a large proportion of citizens of Latin-American countries, present a critical study of the salient features of the life of the American Republics to the south of us, and of their relations to the United States. Among the topics especially emphasized are, the Monroe Doctrine, the Mexican Situation, Trade and Business Relations, Diplomatic Relations, and Education.

PROBLEMS AND LESSONS OF THE WAR. Clark University Addresses. Edited by Professor George H. Blakeslee. Foreword by President G. Stanley Hall. New York and London, G. P. Putnam's Sons, 1916, 424 pps. $2.00.

This volume contains side by side the opposing views on the fundamental issues of the war as presented by twenty-four writers of wide reputation. Three British subjects, one a member of Parliament, and three American citizens of German descent and sympathy—all university professors—are among the contributors. Some of the subjects discussed are: The Effect of the War Upon Europe, The German Theory of State, The German Theory of Militarism, What a German Victory Would Mean, The Effect of the War Upon Pan-American Co-operation, The Economic Position of the United States at the Close of the War, Naval Lessons to the United States in the War, The Maintenance of Our National Obligations, The Extension of the Monroe Doctrine, Economic Aspects of the War, Nationalism and War, The Red Cross Work, and Preparedness. President G. Stanley Hall discusses, in his foreword, The Psychology of the Present War.

JOURNALS CONNECTED UNOFFICIALLY WITH THE DEPARTMENTS

The American Journal of Psychology. This journal was commenced in November, 1887, and is now edited by G. Stanley Hall, E. C. Sanford, E. B. Titchener (Cornell University), and J. W. Baird, with the assistance of an international board of coöperators. Each volume contains four numbers—issued in January, April, July and October. Besides original articles, a considerable portion of its space is devoted to careful digests of the important literature in its field. Price $5.00 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

The Pedagogical Seminary. This journal was begun in January, 1891, and is edited by the President of the University with the assistance of William H. Burnham, Professor of Pedagogy. It is an international record of educational literature, institutions and progress, and is devoted solely to the highest interest of education in all grades, with digests of important literature of all countries. It is the organ of the Educational Department of the University. Each volume contains four numbers—issued in March, June, September and December. Price $5.00 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

Journal of Religious Psychology (including its anthropological and sociological aspects). This journal was begun in May, 1904, and has now completed its seventh volume. It is edited by President G. Stanley Hall. The aim of this journal is to publish original material from all parts of the field of religious psychology. Special attention is devoted to the literature of the subject, both books, monographs and articles in current periodicals. It is published irregularly, each volume, of four numbers, containing about 500 pages. Price $3.00 per volume; single copies $1.00. Louis N. Wilson, Publisher, Worcester, Mass.

THE JOURNAL OF RACE DEVELOPMENT. This journal was begun in July, 1910, and is edited by Dr. Blakeslee and President Hall with the coöperation of a board of twenty-one contributing editors. It offers itself as a forum for the discussion of the problems which relate to the progress of races and states generally considered backward in their standard of civilization. Issued quarterly, each number containing about 125 pages. Price $3.00 per volume; 75 cts. per number. Louis N. Wilson, Publisher, Worcester, Mass.

JOURNAL OF APPLIED PSYCHOLOGY. This journal will appear quarterly, beginning March, 1917. It is edited by President G. Stanley Hall and Drs. J. W. Baird and L. R. Geissler, with the coöperation of twenty contributing editors. It aims to be a medium for original investigations on the practical problems of psychology, and to digest the literature in its field through book reviews and summaries of articles appearing in other periodicals. Each volume of four issues will contain about 400 pages. Price $4.00 per volume; single copies $1.25. Florence Chandler, Publisher, Worcester, Mass.

UNIVERSITY COLORS

EMERALD GREEN AND WHITE

To be worn in the hood as a green chevron
on a white field

The Waverly Press
WILLIAMS & WILKINS COMPANY
BALTIMORE, U. S. A.

Clark University
in the City of Worcester
Massachusetts

Register and Thirtieth Official Announcement

1918

CLARK UNIVERSITY

WORCESTER, MASSACHUSETTS

REGISTER AND THIRTIETH OFFICIAL ANNOUNCEMENT

WORCESTER, MASSACHUSETTS
Published for the University
February, 1918

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CALENDAR 1918–1919

1918			
FEB.	1	Friday	Founder's Day*
FEB.	22	Friday	Washington's Birthday
APRIL	1	Monday	Spring Recess
APRIL	6	Saturday	
APRIL	19	Friday	Patriots' Day
MAY	30	Thursday	Memorial Day
JUNE	20	Thursday	Twenty-ninth academic year closes

Summer Vacation of 14 Weeks

SEPT.	25	Wednesday	Thirtieth academic year begins
OCT.	12	Saturday	Columbus Day
NOV.	28	Thursday	Thanksgiving Day
DEC.	20	Friday	Christmas Recess
1919			
JAN.	2	Thursday	
FEB.	1	Saturday	Founder's Day*
FEB.	22	Saturday	Washington's Birthday
APRIL	7	Monday	Spring Recess
APRIL	12	Saturday	
APRIL	19	Saturday	Patriots' Day
MAY	30	Friday	Memorial Day
JUNE	19	Thursday	Thirtieth academic year closes

*Not a holiday

UNIVERSITY SENATE

Granville Stanley Hall
William Edward Story
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Henry Taber
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John Wallace Baird
Ralph Stayner Lillie
Charles A. Kraus
Frank Hamilton Hankins

OTHER MEMBERS OF THE FACULTY

Joseph de Perott
Louis N. Wilson
Frank Blair Williams

UNIVERSITY STAFF

GRANVILLE STANLEY HALL, PH.D., LL.D. 156 Woodland St.
President of the University and Professor of Psychology

A.B., Williams College, 1867; A.M., 1870; Ph.D., Harvard University, 1878; Lecturer in Harvard and Williams Colleges, 1880–81; Professor of Psychology, Johns Hopkins University, 1881–88; President and Professor of Psychology, Clark University, 1888–; LL.D., University of Michigan, 1888, Williams College, 1889, and Johns Hopkins University, 1902; Chairman of the Library Committee and Curator of the Art Collection, Clark University. Member of the National Academy of Sciences; Resident Member of the Massachusetts Historical Society.

WILLIAM EDWARD STORY, PH.D. 17 Hammond St.
Professor of Mathematics and Secretary of the Faculty

A.B., Harvard University, 1871; Ph.D., University of Leipzig, 1875; Parker Fellow (Harvard), 1874–75; Tutor of Mathematics, Harvard University, 1875–76; Associate, Assistant Professor, and Associate Professor of Mathematics, Johns Hopkins University, 1876–89; Professor of Mathematics, Clark University, 1889–; Professor of Mathematics, Clark College, 1902–07. Member of the National Academy of Sciences; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

EDMUND CLARK SANFORD, PH.D., SC.D., LL.D.
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A.B., University of California, 1883; Fellow, Johns Hopkins University, 1887; Ph.D. Johns Hopkins University, 1888; Instructor in Psychology, Johns Hopkins University, 1888; Instructor in Psychology, Clark University, 1889-92; Assistant Professor, 1892–1900; Professor of Psychology, Clark College, 1903–07; Professor of Experimental and Comparative Psychology, Clark University, 1900–09; Lecturer on College Administration, 1909–; Sc.D., Hobart College, 1909; President of Clark College, 1909–; LL.D., University of California, 1912.

ARTHUR GORDON WEBSTER, PH.D., SC.D., LL.D.
Professor of Physics 66 West St.

A.B., Harvard University, 1885; Instructor in Mathematics, Harvard University, 1885-86; Parker Fellow, 1886–89; Student, Universities of Berlin, Paris, Stockholm, 1886–90; Ph.D., University of Berlin, 1890; Docent in Physics, Clark University, 1890–

92; Assistant Professor, 1892–1900; Professor, 1900–; Professor of Physics, Clark College, 1902–07; Director of Physical Laboratories; Sc.D., Tufts College, 1905; LL.D., Hobart College, 1908. Member of the National Academy of Sciences; Resident Fellow of the American Academy of Arts and Sciences; Member of the American Philosophical Society.

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Professor of Mathematics 26 Dayton St.

Ph.B., Yale University, 1882; Ph.D., Johns Hopkins University, 1888; Assistant in Mathematics, Johns Hopkins University, 1888–89; Docent in Mathematics, Clark University, 1889–92; Assistant Professor, 1892–1903; Professor, 1903–; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

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Professor of Pedagogy and School Hygiene 767 Main St.

A.B., Harvard University, 1882; Instructor in Wittenberg College, 1882–83; Instructor, State Normal School, Potsdam, N. Y., 1883–85; Fellow, Johns Hopkins University, 1885–86; Ph.D., 1888; Instructor in Psychology, 1888–89; Docent in Pedagogy, Clark University, 1890–92; Instructor, 1892–1900; Assistant Professor, 1900–06; Professor, 1906–.

GEORGE HUBBARD BLAKESLEE, PH.D. 21 Downing St.

Professor of History and International Relations

A.B., Wesleyan University, 1893; A.M., Harvard University, 1899; Ph.D., 1903; Student, Johns Hopkins University, 1893–94; Parker Fellow, Harvard, 1901–02; Student, Universities of Berlin, Leipzig, and Oxford, 1901–03; Instructor in History, Clark College, 1903–04; Assistant Professor, 1904–09; Professor, 1909–; Instructor in History, Clark University, 1905–11; Professor, 1911–.

JOHN WALLACE BAIRD, PH.D.

Professor of Experimental Psychology 7 Lucian St.

A.B., University of Toronto, 1897; Student, University of Leipzig, 1898–99; Fellow, University of Wisconsin, 1899–1901; Fellow, Cornell University, 1901–02; Ph.D., 1902; Assistant in Psychology, 1902–03; Carnegie Research Assistant, 1903–04; Instructor in Psychology, Johns Hopkins University, 1904–06; Instructor in Psychology, University of Illinois, 1906–07; Assistant Professor, 1907–February, 1910; Assistant Professor of Experimental Psychology, Clark University, February, 1910–February, 1913; Professor, February, 1913–.

RALPH STAYNER LILLIE, PH.D.

Professor of Biology 21 Dayton St.

A.B., University of Toronto, 1896; Student, University of Michigan, 1896–97; Fellow, University of Chicago, 1898–1901; Ph.D., 1901; Assistant in Physiology, Harvard University, 1901–02; Instructor, University of Nebraska, 1902–03; Adjunct Professor, 1903–04; Carnegie Research Assistant at Zoölogical Station, Naples, 1904–05; Instructor in Physiology, Harvard University, 1905–06; Johnston Scholar, Johns Hopkins University, 1906–07; Instructor in Physiological Zoölogy, University of Pennsylvania, 1907–12; Assistant Professor of Experimental Zoölogy, 1912–13; Instructor in General and Comparative Physiology, Marine Biological Laboratory, Woods Hole, Mass., 1902–; Professor of Biology, Clark University, October 1913–.

Charles A. Kraus, Ph.D.

Professor of Chemistry 11 Downing St.

B.S., University of Kansas, 1898; Fellow in Physics, Johns Hopkins University, 1899–1900; Research Fellow, Kansas University, 1900–01; Instructor in Physics, University of California, 1901–04; Research Assistant, Massachusetts Institute of Technology, 1904–08; Ph.D., 1908; Research Associate, 1908–12; Assistant Professor of Physical Chemical Research, 1912–14; Professor of Chemistry and Director of the Chemical Laboratories, Clark University, 1914–.

Frank Hamilton Hankins, Ph.D.

Professor of Sociology 4 Cabot St.

A.B., Baker University, 1901; Student, Columbia University, 1903–04; Scholar in Sociology, 1904–05; Fellow in Statistics, 1905–06; Student, 1907–08; Ph.D., Columbia University, 1908; Instructor in Economics, Clark College, 1906–07; Assistant Professor, 1908–13; Professor of Political and Social Science, 1913–; Instructor in Economics and Sociology, Clark University, 1906–07; 1908–15; Assistant Professor of Sociology, 1915–17; Professsor, 1917–.

Joseph de Perott

Lecturer in Mathematics 5 Hawthorn St.

Student, Universities of Paris and Berlin, 1877–80; Docent in Mathematics, Clark University, 1890–1904; Lecturer, 1904–.

Louis N. Wilson, Litt.D. 11 Shirley St.

Librarian of the University and Custodian of the Art Collection

Litt.D., Tufts College, 1905.

Frank Blair Williams, Ph.D.

Instructor in Mathematics (Absent on leave)

C.E., University of Missouri, 1890; M. S., 1893; Engineering Work with the Mississippi River Commission, 1890–92; Teaching Fellow in Mathematics, University of Missouri, 1892–93; Survey Work with the Mississippi River Commission, 1894–95; United States Assistant Engineer in Tennessee River Improvement, 1895–97; Scholar in Mathematics, Clark University, 1897–98; Fellow, 1898–1900; Ph.D., 1900; Assistant Professor of Civil Engineering, Union College, 1900–05; Assistant Professor of Engineering and Mathematics, 1905–06; Professor of Engineering Mathematics, 1906–07; Assistant Professor of Mathematics, Clark College, 1907–08; Professor, 1908–; Honorary Fellow in Mathematics, Clark University, 1909–10; Instructor, 1910–; Fellow of the American Association for the Advancement of Science; Member of the American Mathematical Society and of the Mathematical Association of America.

EDWARD COWLES, M.D., LL.D., Boston
Non-Resident Lecturer in Psychiatry

A.B., Dartmouth College, 1859; A.M., 1863; Medical House Pupil, Retreat for the Insane, Hartford, Conn., 1860–62; M.D., Dartmouth Medical School, 1863; M.D., College of Physicians and Surgeons, New York, 1863; Medical Corps, United States Army, 1863–72; Resident Physician and Superintendent, Boston City Hospital, 1872–79; Medical Superintendent, McLean Hospital, Waverley, Mass., 1879–1903; Lecturer on Mental Diseases, Dartmouth Medical School, 1885–86; Professor of Mental Diseases, 1886–; Fellow by Courtesy, Johns Hopkins University, 1887-88; Clinical Instructor in Mental Diseases, Harvard Medical School, 1888–; LL.D., Dartmouth College, 1890; Non-Resident Lecturer in Psychiatry, Clark University, 1903–.

ARTHUR WALLACE CALHOUN, PH.D.
Lecturer in Sociology 42 Maywood St.

A.B., University of Pittsburgh, 1906; Professor of English and Philosophy, New Windsor College, 1906–07; Professor of Latin and History, Normal School, St. Petersburg, Fla., 1907–09; Instructor in German and History, Florida State College for Women, 1910–11; Professor of Philosophy and Social Science, Lenox College, 1912–13; A.M., University of Wisconsin, 1913; Professor of Social Science, Maryville College, 1913–15; Fellow in Sociology, Clark University, 1915–16; Ph.D., 1916; Assistant Professor of Economics, Clark College, 1916–; Lecturer in Sociology, Clark University, 1916–.

SAMUEL WEILLER FERNBERGER, PH.D. (Absent on leave)
Assistant Professor of Experimental Psychology

B.S., University of Pennsylvania, 1908; M.A., 1909; Ph.D., 1912; Assistant in Psychology, University of Pennsylvania, 1908–09; Instructor, 1910–12; Instructor in Experimental Psychology, Clark University, 1912–15; Assistant Professor, 1915–.

LUDWIG REINHOLD GEISSLER, PH.D. 31 Florence St.
Demonstrator in Experimental and Applied Psychology

B.Lit., University of Texas, 1905; Assistant in Psychology, Cornell University, 1905–09; Ph.D., 1909; Instructor in Psychology, 1909–11; Associate Professor of Psychology and Education, University of Georgia, 1912–16; Assistant Professor of Psychology and Education, Clark College, 1916–.

ROBERT HUTCHINGS GODDARD, PH.D.
Instructor in Physics 5 Bishop Ave.

B.S., Worcester Polytechnic Institute, 1908; A.M., Clark University, 1910; Ph.D., 1911; Instructor in Physics, Worcester Polytechnic Institute, and Student in Physics, Clark University, 1908–09; Fellow in Physics, 1909–11; Honorary Fellow, 1911–12, 1914–15; Research Instructor in Physics, Princeton University, 1912–13; Instructor in Physics, Clark College, 1914–15; Assistant Professor of Physics, 1915–; Instructor in Physics, Clark University, 1916–.

NORMAN SCOTT BRIEN GRAS, PH.D.

Assistant Professor of History — 2 Isabella St.

A.B., A.M., Western University, 1906; A.M., Harvard University, 1909; Ph.D., 1912; University Scholar, Harvard University, 1907–08; Goodwin Fellow, 1908–09; Kirkland and Sheldon Traveling Fellow (Europe), 1910–12; Instructor in Economics, Western University, 1905–06; Assistant in History, Harvard University, 1909–10; Assistant Professor of History, Clark College, 1912–17; Associate Professor, 1917–; Lecturer in History, Clark University, 1913–15; Instructor, 1915–17; Assistant Professor, 1917–.

RALPH GIBNEY HURLIN, PH.D.

Docent in Genetics — 18 Oread St.

A.B., Brown University, 1912; A.M., 1913; Oliver Cromwell Gorton Arnold Fellow and Assistant in Elementary Biology, 1913–15; Ph.D., 1915; Honorary Fellow in Biology, Clark University, 1915–16; Instructor in Biology, Clark College, 1915–16; Assistant Professor, 1916–; Docent in Genetics, Clark University, 1916–.

JAMES EDMUND IVES, PH.D.

Research Associate and Lecturer in Physics — 1030 Main St.

Instructor in Physics, Drexel Institute, 1893–97; Student in Physics, Cavendish Laboratory, Cambridge, England, 1896; Scholar in Physics, Clark University, 1897–98; Fellow, 1898–1901; Ph.D., 1901; Instructor in Physics, University of Cincinnati, 1901–03; Assistant Professor, 1905–10; Associate Professor, 1910–12; Honorary Fellow in Physics, Clark University, 1912–16; Research Associate, 1916–17; Resident Fellow of the American Academy of Arts and Sciences.

KARL JOHAN KARLSON, PH.D.

Lecturer in Philosophy — 6 Wyman St.

A.B., Clark College, 1909; Scholar in Psychology, Clark University, 1909–10; A.M. 1910; Fellow, 1910–12; Ph.D., 1912; Honorary Fellow in Psychology, Clark University, 1912–14; Lecturer in Philosophy, 1914–.

BENJAMIN SHORES MERIGOLD, PH.D.

Instructor in Chemistry — 34 Chatham St.

A. B., Harvard University, 1896; A.M., 1897; Ph.D., 1901; Assistant in Chemistry, Harvard University, 1896–1900; Instructor in Chemistry, Worcester Polytechnic Institute, 1900–03; Assistant Professor of Chemistry, Clark College, 1903–08; Professor, 1908–; Instructor in Chemistry, Clark University, 1905–12, 1915–.

JAMES PERTICE PORTER, PH.D., SC.D.

Lecturer in Psychology — 209 Lovell St.

A.B., Indiana University, 1898; A.M., 1901; Instructor in Psychology, 1900–03; In charge of work in Neurology, Indiana University Biological Station, 1901 and 1903; Honorary Fellow in Psychology, Clark University, 1903–09; Ph.D., 1906; Instructor in Psychology, Clark College, 1903–07; Assistant Professor, 1907–12; Dean of the Faculty, 1909–; Lecturer in Psychology, Clark University, February–June, 1910; Instructor, 1910–12; Lecturer, 1915–; Professor of Psychology, Clark College, 1912–; Sc.D., Waynesburg College, 1917.

OTHER MEMBERS OF THE UNIVERSITY

George Frederic White, Ph.D.

Instructor in Biological Chemistry 1 Lucian St.

S.B., Massachusetts Institute of Technology, 1906; Ph.D.. Johns Hopkins University, 1910; Assistant in Analytical and Organic Chemistry, Massachusetts Institute of Technology, 1906–08; Fellow, Johns Hopkins University, 1909–10; Associate Professor of Chemistry, Richmond College, 1910–12; Instructor in Organic Chemistry, Clark College, 1912–13; Assistant Professor, 1913–Feb. 1918; Associate Professor, Feb. 1918–; Docent in Biological Chemistry, Clark University, 1913–Jan. 1915; Instructor Jan. 1915–.

Shinichi Kurihara, A.M., Ibaraki, Japan

Fellow in Experimental Psychology and Research Assistant to Dr. Baird 8 Loudon St.

Graduate, Aoyama Gakuin, 1910; Student, Drew Theological Seminary, 1913–15; New York University, 1914–15; B.D., Drew Theological Seminary, 1915; Scholar in Psychology, Clark University, 1915–16; A.M., 1916; Fellow in Experimental Psychology, Clark University, 1916—.

Amy Eliza Tanner, Ph.D.

Lecturer in the Children's Institute and Research Assistant to President Hall 9 Hawthorn St.

A.B., University of Michigan, 1893; Scholar, University of Chicago, 1894–95; Fellow, 1895–98; Ph.D., University of Chicago, 1898; Associate in Philosophy, 1898–1902; Professor of Philosophy, Wilson College, 1903–07; Honorary Fellow in Psychology, Clark University, 1907–09; Lecturer in the Children's Institute, 1909–; Research Assistant to President Hall, 1911–.

Louis Ten Eycke Thompson, Ph.D., South Haven, Michigan

Research Assistant to Dr. Webster 48 Downing St.

B.S., Kalamazoo College, 1914; Scholar in Physics, Clark University, 1914–15; A.M., 1915; Fellow, 1915–17; Ph.D., 1917; Research Assistant to Dr. Webster, 1916–; Instructor in Mathematics and Physics, Clark College, 1917–.

Irving Angell Field, Ph.D.

Honorary Fellow in Biology 1 Autumn St.

B.S., Denison University, 1903; Instructor in Ornithology, 1902–03; Assistant in Zoölogy, Harvard University, 1903–05; Austin Teaching Fellow, 1905–06; Professor of Chemistry and Biology, Western Maryland College, 1906–11; A.M., Harvard University, 1912; Instructor in Biology, Clark College, 1911–13; Honorary Fellow in Biology, Clark University, 1911–; Ph.D., 1913; Assistant Professor of Biology, Clark College, 1913–16; Associate Professor, 1916–.

Hagop Boghoss Boghossian, Ph.D.
Honorary Fellow in Pedagogy 103 May St.

A..B., Apostolic College, Konia, Asia Minor, Turkey, 1911; Instructor: 1911-14; A.M., Teachers College, Columbia University, 1915; Fellow in Pedagogy, Clark Universty: 1915-17; Ph.D., 1917.

Willard James Fisher, Ph.D., Woods Hole
Honorary Fellow in Physics 28 Baker St.

A.B., Amherst College, 1892; Instructor in Physics, Cornell University, 1903-12; Ph.D., 1908; Professor of Physics, New Hampshire College, 1912-16; Honorary Fellow in Physics, Clark University, 1916–.

Harvey Carson Grumbine, Ph.D., Lebanon, Pennsylvania
Honorary Fellow in Psychology 50 Woodland St.

Ph.B., Wesleyan University, 1892; Ph.D., University of Munich, 1900; Instructor in English, Pennsylvania State College, 1900–01; Assistant Professor of English, Washington University, St. Louis, 1901–02; Professor of English Literature, College of Wooster, 1902–16; Honorary Fellow in Psychology, Clark University, 1916–

George Alexander Hutchinson, Ph.D., Sparksville, Indiana
Honorary Fellow in Psychology 103 May St.

A.B., Indiana University, 1906; A.M., 1908; Assistant in Psychological Laboratory, 1997–08; Fellow in Psychology, Clark University, 1908-10; Ph.D., 1910; Professor of Psychology and Education, Carnegie Institute of Technology, 1910-13; Drury College, 1916-17; Honorary Fellow in Psychology, Clark University, Feb., 1918–.

Samuel James Plimpton, Ph.D., Hartford, Connecticut
Honorary Fellow in Physics 79 West St.

Ph.B., Sheffield Scientific School, 1905; Ph.D., Yale University, 1912; Instructor in Physics, Yale College, 1912–13; Johns Hopkins University, 1913–14; Worcester Polytechnic Institute, 1914–; Scholar in Physics, Clark University, 1914–15.

Mildred Allen, A.M., West Roxbury
Fellow in Physics 9 Hawthorn St.

A.B., Vassar College, 1916; Scholar in Physics, Clark University, 1916–17; A.M., 1917.

Royal Tyler Balch, A.M., Kalamazoo, Michigan
Fellow in Chemistry 65 Downing St.

B.S., Kalamazoo College, 1916; Scholar in Chemistry, Clark University, 1916–17; A.M., 1917; Fellow, Sept. 27–Oct. 27, 1917.

Charles Bird, A.M., Birkenhead, England
Fellow in Psychology 3 Lowell St.

B.H., International Y. M. C. A. College, Springfield, 1916; Assistant in Physical Training, Clark College, 1916–; Scholar in Psychology, Clark University, 1916–17; A.M., 1917.

Irving Thayer Boardman, A.M., Providence, Rhode Island
Fellow in Pedagogy 12 Oberlin St.

A.B., Brown University, 1914; A.M., 1915; Fellow in Pedagogy, Clark University, 1915–.

John Edward Brierly, A.M.
Fellow in History 34½ Douglas St.

A.B., Clark College, 1916; Assistant in History, 1916–; Scholar in History, Clark University, 1916–17; A.M., 1917.

Chung Yen Chiu, A.M., Chekiang, China
Fellow in Chemistry 23 Maywood St.

A.B., University of California, 1915; Student, Massachusetts Institute of Technology, 1915–16; Scholar in Chemistry, Clark University, 1916–17; A.M., 1917.

Elmer Bagnall Clark, A.M., Bradford
Fellow in Psychology 46 May St.

B.H., International Y. M. C. A. College, Springfield, 1914; Assistant in Physical Training, Clark College, 1916–; Scholar in Psychology, Clark University, 1916–17; A. M., 1917.

John Wesley Field, A.M., South Lancaster
Fellow in History 672 Main St.

A.B., Union College, 1909; A.M., University of Nebraska, 1911; Instructor in History, South Western Junior College, 1911–13; Student, University of Berlin, 1913–14; University of Geneva, Sept. 1914–Feb. 1915; Student in History, Clark University, 1916–17; Fellow, Sept.–Dec. 22, 1917.

Austin Perry Finley, B.D., Bethany, West Virginia
Fellow in Psychology 4 Englewood Ave.

A.B., Kentucky University, 1899; A.M., 1906; B.D., Harvard Divinity School, 1908; Fellow in Psychology, Clark University, 1908–09; Dean of the Biblical Department, Drury College, 1909–11; Thos. W. Phillips Professor of Hebrew and Church History, Bethany College, 1911–16; Fellow in Psychology, Clark University, 1916—.

Earl Nelson Johnston, Ph.B., West Lafayette, Ohio
Fellow in Biology 14 Columbus St.

Ph.B., West Lafayette College, 1909; Fellow in Biology, Clark University, 1916–.

PING LING, A.M., Ku Tze Shien, Ho-nan, China
Fellow in Psychology 54 Downing St.

A.B., Stanford University, 1916; A.M., Columbia University, 1917.

IVAN EUGENE MCDOUGLE, A.M., Richmond, Kentucky
Fellow in History 15 Shirley St.

A.B., Clark College, 1915; Assistant in History, 1915–; Scholar in History, Clark University, 1915–16; A.M., 1916; Fellow, 1916–.

KELLY MILLER, JR., A.M., Washington, D. C.
Fellow in Physics 204 Chandler St.

B.S., Howard University, 1916; Scholar in Physics, Clark University, 1916–17; A.M., 1917.

IVA LOWTHER PETERS, A.M., Fishkill, New York
Fellow in Sociology 767 Main St.

A.B., Syracuse University, 1901; Instructor in Social Science, Parker Collegiate Institute, Brooklyn, 1912–17; A.M., Columbia University, 1916.

MAURICE E. J. PIETERS, Brussels, Belgium
Fellow in Pedagogy 66 Downing St.

Graduate, École Normale de Bruxelles, 1912.

SAMUEL ERNEST POND, A.M., Woonsocket, Rhode Island
Fellow in Biology 24 Beaver St.

B.H., International Y.M.C.A. College, Springfield, 1912; Fellow in Biology, Clark University, 1915–Jan. 12, 1918; A.M., 1917.

MARY D. REBBOLI, A.M.
Fellow in History 288 Pleasant St.

A.B., Wellesley College, 1903; A.M., 1908; Student in History, Clark University, 1915–17.

ELLERY FRANCIS REED, B.S., Fulton, Missouri
Fellow in Sociology 3 Woodbine St.

B.S., Lenox College, 1914; Scholar in Sociology, Clark University, Jan.–June, 1916; Special Student at Union Theological Seminary, 1916–17.

ALBERTINE ROSENFELD, A.M., New York City
Fellow in Psychology 13 Gates St.

A.B., Hunter College, 1914; A.M., Columbia University, 1917.

William Roderick Sherman, A.M., Newport, Rhode Island
Fellow in History 28 Hollywood St.

A.B., Clark College, 1913; Assistant in History, 1913–14; Scholar in History, Clark University, 1913–14; A.M., 1914; Professor of History and Social Science, Juniata College, 1914–15; Professor of History and Economics, Buena Vista College, 1915–17.

Jesse William Sprowls, B.S.
Fellow in Pedagogy 10 Englewood Ave.

B.S., Valparaiso University, 1910; B.S. in E., University of Pittsburgh, 1915; Professor of Education, Bethany College, 1915–17.

Francis Cecil Sumner, A.M., Phoebus, Virginia
Fellow in Psychology 20 Bluff St.

A.B., Lincoln University, 1915; A.B., Clark College, 1916; Instructor in German and Psychology, Lincoln University, 1916–17; A.M., 1917.

Albert Perlea Van Dusen, A. M.
Fellow in Sociology 42 Maywood St.

A.B., University of Rochester, 1905; B.D., Rochester Theological Seminary, 1909; A.M., University of Chicago, 1912; Professor of Sociology, Carson and Newman College, 1912–17.

Leonard Dupee White, A.M.
Fellow in Sociology 38 Woodland St.

B.S., Dartmouth College, 1914; A.M., 1915; Parker Fellow, Dartmouth College, at the University of Chicago, 1914–15; Instructor fn Government and Debating, Clark College, 1915–; Fellow in Sociology, Clark University, 1916–.

Austin Lawrence Whittey, A.M.
Fellow in History 79 Fox St.

A.B., Clark College, 1916; Scholar in History, Clark University, 1916–17; A.M., 1917.

Michael Jacob Zigler, A.M., Broadway, Virginia
Fellow in Pedagogy 103 May St.

A.B., Bridgewater College, 1916; Scholar in Pedagogy, Clark University, 1916–17; A.M., 1917; Fellow in Pedagogy, Sept. 1917–Feb. 1918; Instructor in Psychology, Cornell University, Feb. 1918–.

Roe-Merrill Secrist Heffner, A.M., Bellefontaine, Ohio
Honorary Scholar in History 79 West St.

A.B., Wittenberg College, Ohio, 1913; Instructor, Latin and German, 1913–15; A.M., 1915; A.M., Harvard University, 1916; Instructor in German, Worcester Polytechnic Institute, 1916–.

Willard Louis Osborn, A.B., Leicester
Honorary Scholar in Mathematics

A.B., Clark College, 1906; Instructor in Mathematics and Physics, Hobart College, 1910–14; Fellow in Mathematics, Clark University, 1914–15.

Leroy Elden Peabody, A.M.
Honorary Scholar in Mathematics 40 Orne St.

B.S., Norwich University, 1915; Scholar in Mathematics, Clark University, 1915–16; A.M., 1916; Assistant in Mathematics, Lehigh University, 1916–17; Instructor in Mathematics, Worcester Polytechnic Institute, 1917–.

Walton Bremner Scott, B.S., Providence, Rhode Island
Honorary Scholar in Chemistry 143 Highland St.

B.S., Worcester Polytechnic Institute, 1916; Assistant in Chemistry, 1916–; Scholar in Chemistry, Clark University, 1916–17.

Axel Johan Uppvall, A.M.
Honorary Scholar in Psychology 26 Woodland St.

A.B., Colby College, 1905; A.M., Harvard University, 1907; Instructor in French and German, University of New Brunswick, 1909–10; Instructor in French, University of Pennsylvania, 1910–11; Professor of French and German, University of New Brunswick, 1911–16; Assistant Professor of German, Clark College, 1916–.

Phyllis Mary Blanchard, A.B., Epping, New Hampshire
Scholar in Psychology 10 Oberlin St.

A.B., New Hampshire College, 1917.

Fred Joseph Brennan, A.B.
Scholar in History 10 Shawmut St.

A.B., Clark College, 1917; Assistant in History, 1917–.

Ralph Hadley Bullard, A.B., Paxton
Scholar in Chemistry 35 Maywood St.

A.B., Clark College, 1917; Assistant in Chemistry, 1917–.

Clarence Nichols Hickman, A.B., New Albany, Indiana
Scholar in Physics 11 Preston St.

A.B., Winona College, 1914.

Thomas Benjamin Hill, B.H., Perth, Western Australia
Scholar in Pedagogy 25 Hollywood St.

B.H., International Y. M. C. A. College, Springfield, 1917.

YÜ, TINN HUGH, A.B., Canton, China
Scholar in Sociology 52 May St.

LL.B., Valparaiso University, 1915; Pd.B., 1917; A.B., University of Maine, 1917.

CARL DAVID JOHNSON, A.B.
Scholar in Physics 1 Webster St.

A.B., Clark College, 1915; Assistant in Physics and Physical Training, 1915–16; Assistant in Physics, 1916–; Scholar in Physics, Clark University, 1915–.

CARL EDMUND JONES, A.B., Baldwinville
Scholar in Sociology 28 Hollywood St.

A.B., Clark College, 1917; Assistant in Sociology, 1917–.

TOMEHACHI KAWAMURA, Nagasaki, Japan
Scholar in Chemistry 15 Birch St.

Graduate, Nagasaki Normal School, 1905; Normal School Teacher's Certificate (Government) in Chemistry, 1912; Assistant in Research Laboratory, Tokyo Higher Normal School, 1912–14; Scholar in Chemistry, Clark University, 1916–.

WALTER WILLIAM LUCASSE, A.B., Kalamazoo, Michigan
Scholar in Chemistry 65 Downing St.

A.B., Kalamazoo College, 1917; Assistant in Chemistry, Clark College, 1917–.

KOZABURO MISÉ, M.S., Tokyo, Japan
Scholar in Physics 12 Oberlin St.

C.E., Tokyo Imperial University, 1911; Instructor, Kyu Shu Imperial University, 1911–12; Assistant Professor, 1912–; M.S., University of Illinois, 1916.

BLANCHE LAURETTA MURPHY, PD.B., Portland, Maine
Scholar in Pedagogy 13 Gates St.

Pd.B., University of Maine, 1917.

MABLE THURSTON MURRAY, PD.B., Newport, Rhode Island
Scholar in History 7 Hawthorn St.

Pd.B., University of Maine, 1917.

CLARA EVE SCHIEBER, B.S. in E., Bucyrus, Ohio
Scholar in History 9 Hawthorn St.

B.S. in E., Ohio University, 1916.

Thomas Hancock, A.M., Oakdale
Student in Psychology

S.T.L., Wesleyan College, Montreal, 1906; B.D., Hartford Theological Seminary, 1914; Student in Psychology, Clark University, 1915–; A.M., 1916.

LeRoy Marshall Handy, A.B.
Student in History 8 Kimball St.

A.B., Clark College, 1908; Student in History, Clark University, 1916–.

James King, A.M., Shrewsbury
Student in Psychology

A.B., Oskaloosa College, 1912; S.T.B., Boston University, 1915; Scholar in Psychology, Clark University, 1915–16; A.M., 1916; Student, 1916–.

Frederica Feitshans Kraus, A.B.
Student in Biology 11 Downing St.

A.B., Kansas University, 1902; Student in Biology, Clark University, 1915–.

Ellen Augusta Maher
Student in Experimental Psychology 766 Pleasant St.

Graduate, Worcester State Normal School, 1912; Student in Experimental Psychology, Clark University, 1916–.

Ellen Josephine O'Leary
Student in Experimental Psychology 98 Hamilton St.

Graduate, Worcester State Normal School, 1912; Student in Experimental Psychology, Clark University, 1916–.

Anne Wade O'Neill, Chickasha, Oklahoma
Student in History 31 Hollywood St.

Head of the Department of History and Economics, Oklahoma College for Women, 1909–.

Carl Lisle Percy, A.M., Charlton
Student in Sociology

A.B., Middlebury College, 1907; Instructor in English, Atlanta Theological Seminary, 1909–11; B.D., 1911; Student in Sociology, Clark University, 1911–13; A.M., 1913; Student, 1914–15.

Bronson Sörenson Saxild, A.B., South Lancaster
Student in Psychology

A.B., Pacific Union College, California, 1915.

CARL DAVID SMITH, B.H.
Student in Pedagogy 53 Queen St.
B.H., International Y. M. C. A. College, Springfield, 1914.

LAURA GERTRUDE SMITH
Student in Pedagogy 466 Pleasant St.
Student in Pedagogy, Clark University, 1916-.

CHESTER D. STILES, A.M., Grafton
Student in Pedagogy
A.B., Williams College, 1900; A.M., 1909.

TORAJIRO TAKAGAKI, Cambridge
Student in Psychology
Sho-gakushi, Graduate School, Tokyo College of Commerce, 1913; Assistant Professor, 1913-; Graduate Student in Psychology and Economics, Harvard University, 1916-; Student in Psychology, Clark University, Feb. 1918-.

ATTENDANTS UPON SATURDAY COURSES

CHARLES B. HURD, New Britain, Conn.
ELIZABETH M. LINCOLN, Leominster
GLADYS REED, Worcester
H. R. STEVENS, Grafton

FLORENCE CHANDLER 938 Main St.
Bursar, and Clerk of the University

MABEL SODERBERG 5 Hooper St.
Assistant in the Bursar's office

MARY EVELYN FITZSIMMONS, S.B. 48 Downing St
Private Secretary to the President

ADMINISTRATION

The trustees are the ultimate source of authority in all matters pertaining to the University. They act collectively, through committees, and also through the President of the University.

DUTIES OF THE PRESIDENT OF THE UNIVERSITY

The duties of this office were defined by the Trustees, May 23, 1889, as follows:

The President of the University shall consult frequently with the Trustees on all matters that concern the welfare of the University, and attend the meetings of the Board. He shall confer with each instructor concerning the development of his department, determine the duties and authority of each, and preside at the meetings of the Faculty. He shall be the authorized medium of communication between the Board of Trustees and the officers of instruction, individually and collectively, in all matters involving the administration of the University. The enactments of the Board concerning instructors and their work, and all requests, complaints and proposals from the Faculty to the Trustees shall be made known through him. He shall exercise or provide such superintendence over buildings, apparatus, books and other property, as will secure their protection and appropriate use. Expenditures must not be ordered by any instructor of the University without his previous consent or the express authority of the Board.

These duties were more fully defined by By-Laws enacted by the Corporation, Sept. 26, 1889. These are as follows:

BY-LAWS

1. The President of the University shall preside on all public academic occasions, shall direct the official correspondence, study the wants and interests of the whole University and exercise a general superintendence over all its concerns. His first care, and that of the authorities of the University, shall be the departments already established, and next those closely related to them; but no other department shall be established until those already introduced have been brought to the highest state of efficiency then possible. All acts, however, which shall involve the expenditure of money in the administration of the University's affairs, shall be subject to the approval of the Board of Trustees or the Finance Committee for the time being.

2. As the efficiency of a University depends chiefly upon the quality of its Faculty, the Board of Trustees will hold the President to a strict but reasonable accountability for the fidelity and ability of each instructor. The President only shall have the power to select and appoint all officers of instruction, subject to the approval of the Board of Trustees. To make wise and well-considered appointments, to maintain harmony within the Faculty, and to increase their efficiency in research and instruction shall be his most important duty. If at any time the President shall be negligent in the discharge of these or other duties, or is from any cause disabled from discharging them, they may be exercised by the Board of Trustees.

3. The President of the University shall be the medium of communication between the Trustees and Instructors, individually and collectively, upon all matters within the field of

action of either body. He shall attend all meetings of the Board of Trustees, of which he shall be notified, and shall participate in their deliberations, but without the power to vote. All complaints and requests from members of one body to the other shall be made through him.

4. The President shall call and preside over all official meetings of the Instructors, and a record of their proceedings shall be kept. These records are in no case to be made known to others than the Trustees. They shall always be in the custody of the President, but may be inspected by the Trustees, or either of them, at any time.

5. The President of the University, in the absence of the Trustees or Finance Committee, shall have the entire direction and control of the persons employed about the University and not engaged in the work of instruction; the duties of all such persons shall be assigned and they shall be appointed or removed by him, subject to the approval of the Finance Committee.

6. No instructor shall order any books or apparatus, or anything connected with the work of instruction (beyond his appropriation), without the approval of the President. No expense for the care of buildings or grounds, nor for alterations or repairs within and upon the same shall be made without the approval of the Board of Trustees or the Finance Committee, such alterations or repairs in no case to exceed the appropriations made for that purpose. If the Trustees, or Finance Committee,or any person, shall make contracts in behalf of the University without authority, the officer or person making such contract shall become individually responsible therefor.

7. The officers of instruction shall be appointed for a term of from one to five years. At the end of this period the work of each instructor will be subjected to a careful scrutiny upon the results of which his reappointment shall depend, always provided, however, that any Instructor will be liable to be dis-

charged at any time for incapacity, neglect of duty or for such other cause as shall seem good to the Trustees.

8. Each Instructor shall give stated lectures to however few. He shall actively and zealously strive to maintain the highest possible standard, shall work in a spirit of hearty sympathy and coöperation, and shall encourage research by precept and, if possible, by example.

9. The foregoing By-Laws are intended to embody the provisions contained in a vote passed by the corporation on the twenty-third day of May, A.D. 1889, upon the motion of Judge Devens. (See above.) If at any time hereafter any discrepancy shall be found to exist between the two, said By-Laws shall be so far modified as to conform to the provisions of said vote.

10. No instructor shall engage in any outside professional or technical pursuit without the approval of the Board, the Finance Committee, or the President.

11. These By-Laws, or any one of them, may be changed, amended, or repealed by a vote of three-fourths at least of the Trustees at any meeting of their Board duly called, notified, and held for that purpose.

GENERAL STATEMENTS

The University now consists of eight departments, in which all its work and that of Instructors, Fellows and Scholars is grouped.

These departments are as follows:

I. MATHEMATICS
II. PHYSICS
III. CHEMISTRY
IV. BIOLOGY
V. PSYCHOLOGY
VI. PEDAGOGY
VII. SOCIOLOGY
VIII. HISTORY

THE FACULTY

The University Senate shall consist of the President and the full professors in the University.

They shall determine the general policy of the University in matters pertaining to instruction and research, formulate the requirements for the Master's and Doctor's degrees, recommend candidates for these and for all honorary degrees, such degrees not to be bestowed without their approval.

The Senate shall also approve all appointments to the teaching staff for a term of more than one year, and also all promotions on that staff. They shall act and advise in other matters submitted to them.

The General Faculty shall consist of the President and all members of the regular teaching staff of the University. They shall appoint scholars and fellows and consider all other matters pertaining to the interests of the University that may be officially submitted to them.

ADMISSION

Only graduate students or those of equivalent attainments are admitted to full membership in the University, except in rare and special cases.

At present no entrance examinations are required; but by testimonials, diplomas, personal interviews, or written specimens of work, the authorities must be satisfied that the applicants have scholarship enough to work to advantage, and zeal and ability enough to devote themselves to their chosen field. The methods of the University are too costly, and its energy and funds too precious, to be spent upon those who are not well trained, promising and in earnest.

It is highly desirable that candidates entering any of the eight departments shall have, beside a knowledge of the other subjects commonly taught in colleges, a reading knowledge of French and German.

For the select students who are received, it is the purpose of the University to open all its privileges and to supply every incentive possible in the way of books, facilities, and, above all, direct personal stimulus. The chief as well as the best work of this University is individual and involves daily suggestion, encouragement and direction. The limited number of students permits more or less personal instruction in each case.

CLASSES OF APPOINTEES

No clearly marked line exists between students and instructors. Fellows who have attained some degree of mastery in a special line of work sometimes give brief special courses, which may be attended by professors.

This is a stimulus to the student, and both tests and exhibits power in teaching.

I. DOCENTS

The highest residential appointment not involving membership in the Faculty is that of Docent. These positions are designed for men of marked gifts and attainments who have at least attained the doctorate and wish to engage in research, teaching, or both.

Class A. Free Docents

Each docent of this class will be expected to deliver a limited number of lectures on some topic within his department. In so doing, he shall be entirely independent of other instructors both in his choice of a special topic and his manner of treating it, and responsible only to the President of the University, by whom he shall be appointed after consultation with the head of the department. The free docent shall have command of the resources of the department in the way of books, apparatus, etc., so far as this does not interfere with its regular work. By establishing free docents, the Faculty desires not only to maintain and guarantee the fullest academic freedom, but to expose itself to all the stimulus that can come by the rivalry of younger or outside men, and to introduce new topics and new departures in old ones.

Class B. University Docents

A University docent shall engage in research and may collaborate with the head of the department or other

member of the Faculty and supplement his work. He shall be appointed by the head of the department with the approval of the President.

Habilitation of Docents

A docent of either class may prepare and read in public an habilitation address representing original work after a term of service of a length and under conditions to be determined by the Faculty for each individual case. Upon doing this, he may be formally presented with a certificate or diploma granting him the *venia docendi* or licentiate, which shall not be a title or degree, but shall attest his fitness as scholar or investigator for an academic position and shall be regarded by the University as a brevet collegiate professorship. The fee for such a certificate shall be $25, which the Faculty shall have power to remit. The compensation of a docent of either class, if any, shall be determined by the President, and the fees to be paid him by students, if any, shall be determined by the Bursar.

It is believed that the difficulties of college authorities in selecting suitable professors may be somewhat diminished by the existence of such a select body of scholars of guaranteed scientific training, ability, and approved power to teach, and that this new grade may aid in raising the standard of academic scholarship.

II. QUIZ MASTERS

Each member of the University Faculty may, with the approval of the President, appoint one or more quiz masters who with the aid of his lecture notes, or

otherwise, shall conduct review classes upon his lectures and who may hold preliminary tests, but who shall not lecture or give instruction save as review. These positions shall be regarded as honorary and as a privilege of more advanced students in perfecting their own knowledge and acquiring practice in instruction.

III. NON-RESIDENT LECTURERS

The representatives of each department may, with the approval of the President, bring eminent experts for exchange or other lectures of a special nature at any time during the academic year. They may also in return, with the approval of the President, give similar brief courses in other institutions, provided this does not interfere with their full efficiency for the work of this University.

IV. HONORARY FELLOWS

Those who have already advanced to the Doctor's degree may be appointed Honorary Fellows and given the privileges of the University, including those of the Library. In past years many who have already taken this degree, either in this country or abroad, and who are awaiting academic appointment, have found these positions both helpful for their own further research and development and also advantageous for obtaining the collegiate and university appointments that they seek.

V. CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Candidates for the Doctor's degree must have previously taken the Degree of Bachelor of Arts or have had

a substantial equivalent for the training implied by that degree.

At least one year, but in most cases three years, of graduate work are necessary for this degree. Examinations for it, however, may be taken at any time during the academic year when, in the judgment of the University authorities, the candidate is prepared, provided the requirement of one year's residence has been absolved.

For this degree one requirement is a dissertation upon an approved subject, to which it must be an original contribution of value. To this capital importance is attached. It must be reported on in writing by the chief instructor before the examination, printed at the expense of the candidate, and at least one hundred copies given to the University. However, in case of a dissertation of unusual length, or containing expensive plates, the Faculty shall have power, at the request of the candidate, to reduce this number of presentation copies to fifty.

Such formal or informal tests as the Faculty may determine shall mark the acceptance of each student or Fellow as a candidate for this degree. One object of this preliminary test shall be to insure a good reading knowledge of French and German. Such formal candidature shall precede the examination itself by a period prescribed in the special rules below.

The fee for the Doctor's degree is $25, payable before the examination. The presentation copies of the dissertation must be in the hands of the Librarian before the diploma is delivered. In exceptional cases, and by special action of the Faculty, the act of promotion may precede the presentation of the printed copies of the dissertation.

An oral, but no written, examination is required upon at least one minor subject in addition to the major before an examining jury composed of at least four members, including the head of the department and the President of the University, who is authorized to invite any person from within or without the University to be present and to ask questions. The jury shall report the results of the examination to the Faculty, who will recommend satisfactory candidates for the degree.

For the bestowal of this degree, the approbation of the Board of Trustees must in each case be obtained by their signature upon the diploma. They desire that the standard of requirements for it be kept the highest practicable, that it be reserved for those of superior ability and attainment only, and that its value be never suffered to depreciate.

It is to the needs of candidates for this degree that the lectures, seminaries, laboratories, collections of books, apparatus, etc., are especially shaped, and no pains will be spared to afford them every needed stimulus and opportunity. It is for them that the Fellowships and Scholarships are primarily intended, although any of these honors may be awarded to others.

On November 14th, 1900, the following vote was passed by the Board of Trustees:

> That the University will admit candidates for the degree of Doctor of Philosophy and will confer that degree without regard to sex.

Special Rules concerning the Doctor's Degree

I. *Residence.* No candidate shall receive the degree of Doctor of Philosophy without at least one academic year's previous residence.

II. *Candidature for the Doctor's Degree.* Every applicant for the Doctor's degree shall fill out, before October fifteenth, the regular application blank provided at the office. This schedule shall be submitted to the head of the department. Before affixing his signature he shall satisfy himself, in such manner as he may desire, as to the fitness of the applicant.

III. When countersigned, this schedule shall be filed with the President, and the applicant will be examined in French and German by the annual committee for that purpose.

IV. In case of a favorable report by this committee, the applicant shall be a regular candidate for the degree.

V. Candidates complying with all preliminary conditions, including the examinations in French and German, before November first will be allowed to proceed to the doctor's examination at any time between May fifteenth following and the end of the academic year.

VI. *The Doctor's Dissertation.* The dissertation must be presented to the instructor under whose direction it is written, and reported upon by him before the doctor's examination. In every case the dissertation shall be laid before the jury of examination, at the time of examination, in form suitable for publication. This provision shall not, however, preclude the making of such minor changes later as the chief instructor may approve.

VII. The dissertation shall be printed at the expense of the candidate and the required copies deposited with the Librarian within one calendar year after the first of October following the examination. The candidate alone will be held responsible for the fulfilment of these conditions.

VIII. The favorable report of the chief instructor, filed in writing with the Clerk of the University, shall be a sufficient imprimatur or authorization for printing as a dissertation. The printed copies shall bear upon the cover and title page the statement of approval in the following words, over the signature of the chief instructor:

> A Dissertation submitted to the Faculty of Clark University, Worcester, Mass., in partial fulfilment of the requirements for the degree of Doctor of Philosophy, and accepted on the recommendation of
>
> (NAME OF CHIEF INSTRUCTOR)

IX. *Examinations for the Doctor's Degree.* The examinations for the doctor's degree may be held at any time during the academic year, provided that at least one academic year has elapsed since the completion of the preliminaries of candidature, except in the case of fulfilment of these conditions between the beginning of any academic year and November first of that year, to which case Rule V applies. The examinations shall be held at such hours and places as the President may appoint.

X. Examinations may also be held during the regular vacations of the University, but for these an additional fee of five dollars to each examiner and the reasonable travelling expenses of any examiners who are out of town, all payable in advance, will be required.

VI. CANDIDATES FOR THE DEGREE OF MASTER OF ARTS

This degree is conferred upon candidates who comply with the following requirements:

1. The candidate shall have previously taken the degree of Bachelor of Arts, or have had a substantial

equivalent for the training implied by that degree, to be determined by special vote of the Faculty; but such degree or training must involve a good preparation for the work proposed for the Master's degree, in order that it may be accepted.

2. The candidate must devote a full academic year to post-graduate work in this University after receiving the Bachelor's degree or the training accepted as its equivalent. This work shall be mainly in one department, but the candidate may do also such other work as shall be advised by the head of his principal department —whose approval of the whole course shall be necessary. In particular cases, the candidate may be allowed, by special vote of the Faculty, to divide his work between two years; but the aggregate must, in all cases, amount to a full year's work, at least.

3. The candidate must satisfy the representatives of his principal department that he has done his work faithfully and has mastered the subjects involved, by such written and oral examinations and other tests as the department may require. The head of the department shall make a written report to the Faculty of the grounds on which the candidate is recommended, specifying the amount and character of his work, and this report shall be filed in the office.

4. The candidate must present a thesis or written report on some topic included in his course or closely related to it, that shall receive the approval of the representatives of his principal department, be accepted by the Faculty, and filed in the office.

5. Every candidate recommended for the Master's degree shall pay a fee of ten dollars.

6. The Master's degree will be conferred at the annual commencement in June of any year on those candidates only who shall have made written application to be considered as such on or before January 15th preceding and shall have fulfilled all the conditions here specified at least one week before Commencement, at which time the academic year shall be regarded as ending for the purposes of section 2.

VII. SPECIAL STUDENTS NOT CANDIDATES FOR A DEGREE

Any one desiring to undertake a special and approved line of research, and whose attainments are such as to satisfy the requirements of the University, may also be received. This class includes persons who may desire to devote themselves exclusively to one or more of the special branches—mathematics, physics, chemistry, biology, psychology, pedagogy, economics and sociology, or history—but who do not care to matriculate or become candidates for a degree.

These students, provided they satisfy the heads of the departments of their training and competency in one subject, in which they must be advanced (although they may be less so, or even beginners, in other subjects), may be allowed entire freedom in their choice and combination of studies, and as special students may enjoy all the privileges of the University.

These students may, with the approval of the President, be received for less than an entire year.

Non-university students of less special or less advanced standing than the above classes, who contemplate becoming candidates for some higher degree, may also be received.

Students of this class must satisfy the authorities of the University of their attainments and that they contemplate advancing to a degree higher than that of A.B. The privileges and status of these students will be more fully defined later. They may, in exceptional cases, be elected to Scholarships.

FELLOWSHIPS AND SCHOLARSHIPS

From the George F. Hoar Fund of $100,000 provided by the generosity of Andrew Carnegie, the sum of $3,000 is now available for Junior and Senior Fellowships in the University. While the sums attached to these appointments are not fixed, a Senior Fellow may receive $200 together with the remission of fees; which makes the value of the appointment $300. A Junior Fellow may receive $100 with remission of fees, which makes the value of the appointment $200. Besides these, other appointments of Senior and Junior University Scholarships, with remission of fees, are made.

A CITIZEN'S FUND

A citizen of Worcester has given a fund of $5,000, the income of which is to be used for the aid of "some one or more worthy native born citizens of the city of Worcester who may desire to avail themselves of the advantages of the institution."

THE FIELD FUND

Mrs. Eliza W. Field has also given $500 to be called the "John White Field Fund," the income of which is "to provide for the minor needs of a Scholar or Fellow."

The following regulations apply to the award of the income of the Field Fund:

1. Regard is had to the intellectual ability of the candidate as well as to need of pecuniary assistance.

2. Only candidates who have spent three months at the University are considered.

3. The head of each department will consider and report to the Faculty desirable cases in his department.

4. Applications are received not later than December 15th, and the awards made as soon as possible after the Christmas recess.

THE ELIZA D. DODGE FUND

Mrs. Dodge has given $1,000 to be known as the "Eliza D. Dodge Fund," the income only to be expended in aid of graduate students of limited means engaged in research work.

PURPOSE AND CONDITIONS OF FELLOWSHIPS AND SCHOLARSHIPS

Fellowships at Clark University are intended for young men and women of promise who desire to pursue post-graduate studies in order to fit themselves for intellectual careers. It is desirable, but not required, that candidates for these positions should intend to proceed to the degree of Doctor of Philosophy or to equivalent attainments. In general, those intending to devote themselves to some

special branch of learning are preferred to those directly fitting themselves for one of the three learned professions, although the latter are not excluded.

No application blanks are provided, but it is desired that the candidate should state fully and in writing his previous course of study and submit testimonials or diplomas, especially such as indicate a decided preference for some particular department. These should be accompanied also, if practicable, by some specimen of the candidate's work. Applications will be considered in April and in October and should be in the hands of the President on or before the first day of either month. In special cases vacancies may be filled by appointments at any time during the year. The names of unsuccessful candidates will not be made public.

Fellows must reside in Worcester during the entire academic year, devote themselves to special studies under the direction of their instructors, and give such evidence of progress or proficiency before the end of the year as the authorities shall require. It is generally expected that they will undertake some work of research during the year. They must coöperate in promoting harmony, order, and all the ends of the University, must not teach elsewhere, and may be reappointed at the end of the year. Being intended primarily as honors, both Fellowships and Scholarships are awarded without reference to pecuniary needs, so that those Fellows able and desiring to do so may relinquish the emolument and retain the title.

Besides field work, excursions to institutions (public and private), coaching and cram classes, clubs, examinations, and other modes by which knowledge now seems best imparted and retained, the following educational methods are prominent:

Lectures. The Trustees desire that each instructor, of however few students, should prepare and deliver regular lecture courses, with diagrams, illustrative apparatus, and reference to standard text-books and the best current literature upon each topic. Advanced students are also encouraged to supplement the work of the professors by giving occasional special lectures and courses. Public lectures will be given from time to time.

Seminaries and Conferences. These are stated meetings for joint systematic work, under the personal direction of the professor, in some special part of his subject. Here students preparing theses and papers for publication in the journals edited at the University read them in incomplete form for mutual criticism and help. Here, also, the results of individual reading are reported for the benefit of all; views are freely criticised; new inquiries, methods, comparisons, standpoints, etc., suggested. From the mutual stimulus thus given many important works have proceeded and the efficiency of universities has been greatly increased.

Laboratory Work. For beginners this has been from the first the best of all forms of apprenticeship, bringing student and professor to a closer and mutually stimulating relation. Here the manipulation of apparatus is learned, processes are criticised, results obtained by other investigators are tested and methods discussed and perfected, with a view to developing that independence in research which is the consummation of scientific culture.

NOTICES

The charge for tuition, giving all the privileges of the University, but not covering the laboratory fees, is $100 per annum.

Board and lodging can be obtained near the University at very moderate rates.

Intending students will be given information, so far as possible, upon any of these or other points, in advance of official announcement, upon addressing the Clerk of the University, Miss Florence Chandler, Worcester, Mass.

All members of the University are expected to be present at the opening of each term and continue in attendance to its close.

The following are the statements and announcements of the departments for the academic year, 1918–1919.

I. MATHEMATICS

PROGRAMME FOR 1918–1919

INSTRUCTION IN MATHEMATICS

The chief aim of the department is to make independent investigators of such students as have mathematical taste and ability; these naturally look forward to careers as teachers of the higher mathematics in colleges and universities, and we believe that the course of training best adapted to the development of investigators is also that which is most suitable for all who would be efficient college professors, even if they are not ambitious to engage in research. The first essential of success in either of these lines is the habit of mathematical thought, and the direct object of our instruction is the acquisition of this habit by each of our students. With this end in view, we expect every student to make himself familiar with the general methods and most salient results of a large number of different branches of mathematics, conversant with the detailed results and the literature of a few branches, and thorough master of at least one special topic to the extent of making a real contribution to our knowledge of that subject.

In accordance with these principles, the instruction is given by means of introductory, advanced and special courses of lectures, seminaries, and personal guidance in reading and investigation.

The introductory courses (mostly given in alternate years) treat the following subjects:

ANALYTIC GEOMETRY OF CONICS, HIGHER PLANE CURVES, QUADRICS, HIGHER SURFACES, AND TWISTED CURVES; 5 hours a week, through the year.

DIFFERENTIAL EQUATIONS, AND CALCULUS OF VARIATIONS; 5 hours a week, through the year.

THEORY OF FUNCTIONS OF REAL AND IMAGINARY VARIABLES, ELLIPTIC FUNCTIONS, AND DEFINITE INTEGRALS; 5 hours a week, through the year.

THEORY OF NUMBERS; 2 hours a week, one half-year.

HIGHER ALGEBRA; 2 hours a week, through the year.

ALGEBRAIC SUBSTITUTIONS AND THEIR APPLICATION TO THE THEORY OF EQUATIONS; 2 hours a week, one half-year.

ALGEBRAIC INVARIANTS; 2 hours a week, one half-year.

FINITE DIFFERENCES; 3 hours a week, through the year.

It is expected that every student will take each course in the earliest year of his residence in which it is given, unless he has already completed an equivalent course elsewhere. The chief object of these courses is to make the student familiar with the various methods of mathematical research and the concepts of mathematical thought at the present day. Thus, for example, curves and surfaces are treated by modern methods from the beginning, with adequate consideration of the discoveries of the great geometers of recent times. The usual college courses in the theory of algebraic equations, analytic geometry, and the differential and integral calculus furnish all the necessary preparation for these introductory courses, although it is very desirable that the student be acquainted with the properties of determinants and their application to the solution of linear equations, and with the methods of solving differential equations of the simpler types. Deficiencies in these subjects may be made up by attendance on the corresponding courses in the Collegiate Department of the University.

Special advanced courses, open to all who are prepared for them, are given annually in subjects varying with the interests of the instructors and the needs of the students. These advanced courses are not repeated at regular intervals, but properly prepared students will receive the personal assistance of one or other of the instructors in reading any

subject not announced for the year in which they desire to take it.

The number and scope of the advanced courses given each year have been, thus far, regulated by the number of students qualified to profit by them and by the individual interests of the instructors; these courses will be increased, both in number and variety, whenever a real demand for such an increase shall make itself apparent. While the present purely scientific character of the University precludes instruction in strictly technical branches, we hope that the time is not far distant when the demand shall make it advisable, and increased facilities shall make it possible, to announce courses in Descriptive Geometry, Graphical Statics, Mathematical Astronomy, Vital Probabilities, and all the more important applications of mathematics to other sciences and to technical subjects. The applications of mathematics to physics already receive adequate consideration, and the further extension of such applications awaits only a demand for it on the part of students.

The subjects in which advanced courses may be expected to be given every few years include the following:

HISTORY OF MATHEMATICS.

ARITHMETIC: Numerical computations; Theory of numbers; Finite differences and the Calculus of operations; Probabilities and the Theory of errors; Continued Fractions and their Applications.

ALGEBRA: Substitution-groups and the Galois theory of equations; Invariants; Quadratic forms; Simultaneous equations (including Restricted systems); Multiple algebra.

HIGHER ANALYSIS: Differential equations, ordinary and partial; Continuous groups; Definite integrals and Fourier's series.

THEORY OF FUNCTIONS: Functions of real and complex variables; Point-aggregates; Elliptic functions; Abelian integrals.

GEOMETRY: Modern synthetic geometry; Analytic geometry of higher plane curves, higher surfaces, and twisted curves; Rational and uniform transformations of curves and surfaces; Infinitesimal geometry; Analysis situs; Quaternions; Hyperspace and non-euclidean geometry.

SYMBOLIC LOGIC.

Other courses will be given whenever there is a demand for them, as in the past. The instructors are always glad to assist students in any line of mathematics that falls within the range of their own studies. The small number of students makes it possible to give personal attention to individuals, and the intimate and confidential relation thus established between pupil and teacher is an advantage that cannot be overestimated and ought not to be left out of account by the prospective student in determining where his studies shall be pursued.

For the academic year 1918–19, the following courses of lectures are announced:

BY PROFESSOR STORY

Advanced Courses:

CONTINUED FRACTIONS AND THEIR APPLICATIONS; 3 hours a week, through the year.

HYPERSPACE AND NONEUCLIDEAN GEOMETRY; 3 hours a week, through the year.

THEORY OF ERRORS; 3 hours a week, first half-year.

HISTORY OF MATHEMATICS; 3 hours a week, second half-year.

SEMINARY FOR ADVANCED STUDENTS; through the year.

BY PROFESSOR TABER

Introductory Course:

THEORY OF FUNCTIONS OF REAL AND IMAGINARY VARIABLES, AND ELLIPTIC FUNCTIONS; 5 hours a week, through the year.

Advanced Courses:

THEORY OF BILINEAR FORMS; 2 hours a week, first half-year.

THEORY OF INTEGRAL EQUATIONS; 2 hours a week, second half-year.

SEMINARY; through the year.

BY PROFESSOR WEBSTER

[See announcement of Department of Physics, courses 10, 11, 13, 14.]

Introductory Courses:

THEORY OF NUMBERS; 2 hours a week, first half-year.

ALGEBRAIC SUBSTITUTIONS; 2 hours a week, second half-year.

While desirous of supplying all possible facilities to those who wish to pursue studies in special branches, and to those who, already occupying permanent positions, have but a limited leave of absence, we have made it our chief object to provide a thorough training for those who, having just completed a college course, have not yet entered upon their life-work. This provision consists of such courses of lectures, seminaries, and individual assistance as should enable a faithful student endowed with the proper natural ability to satisfy the requirements for the degree of Doctor of Philosophy at the end of his third year with us. The requirements for this degree have been determined by our conception of the ideal teacher, as already stated. To acquire the necessary breadth of knowledge of mathematics as a whole, the candidate is expected to attend, during his first two years, specified introductory courses of lectures on the general principles, methods, and results of all the more important branches of pure mathematics, to supplement these lectures by private reading and to take an active part in the seminary. In the seminary, a special topic more or less directly connected with the subject of some lecture, is assigned, from time to time, to each student, who is required to read it up and make an oral report upon it before the class. Each candidate for the Doctor's degree is expected to attend a number of advanced courses. He spends the greater part of his third year in the original investigation, under the constant personal guidance of one of the instructors, of a topic of his own selection. In preparing for this investigation he is required to make a practically complete bibliography of the subject and to read all the more important available articles that have been written on it. The results of the investigation, embodied in a dissertation suitable for printing, must be submitted to the instructor under whose direction the work was done, and must receive his approval before the candidate will be admitted to the final examination for the degree. This approval will not be given unless the dissertation is satisfactory in form and completeness and the results are sufficiently novel and important to constitute a real contribution to science. The dissertation is, in fact, the main criterion by which the candidate is judged, and no amount of other work will compensate for its defects.

Each of the instructors is engaged in research and has always a number of investigations planned for himself, which have often been carried to a well advanced stage but are not completed for want of time. Such incomplete investigations are given to properly prepared candidates for the Doctor's degree, and they receive from the instructor all the assistance necessary for the completion of the work, thus becoming, to a certain extent, collaborateurs with the instructor.

The preparation of a bibliography of any topic is greatly facilitated by a classified index of mathematical literature on the card-catalogue plan, which has been prepared under the supervision of Professor Story and now includes over one hundred thousand titles of periodical articles, separate memoirs, and books in all fields of pure mathematics. This index is much more complete than the Royal Society's catalogue, even in the restricted field of that catalogue (periodicals published between 1800 and 1900), and will be extended as rapidly as possible.

The ability of our graduates to carry on research and the excellence of the work actually done is assured by the regulation that each dissertation accepted by us as worthy of the degree shall be printed with the explicit approval of a member of our Faculty. It is evident that, whereas any one that has the necessary preparation and taste for mathematics may profit by the advantages here afforded, only those who have a certain amount of mathematical genius can secure the degree.

In making appointments to fellowships and scholarships we have endeavored to maintain the same high standard. We are on the lookout for mathematical geniuses; but it is difficult to determine from the evidence of others whether candidates come up to our standard or not; so that we have adopted the general policy of giving the best appointments to those only that have been with us for at least one year, and about whom we are in position to judge for ourselves. Of course, this policy could not be carried out during the earlier years of the University, and its effect is apparent in the fact that, whereas seventy-five per cent of the students that entered the mathematical department during the first three years remained with us but one year, only thirty-three per cent of those that have been admitted from 1892 to the present time left at the end of their first year. We do not mean to imply that those who left before completing our course were inferior in ability to those who remained three years, but we desire particularly to encourage men who can and will go forward to the degree.

Nearly all of those who have studied mathematics with us have adopted teaching as a profession, sixty-eight per cent are now members of college faculties, and thirteen per cent are engaged in higher school work. Those who have received the doctor's degree have generally secured at once desirable positions in which to begin their life-work, and most of them have already acquired for themselves, by distinguished ability, very decided influence in the institutions with which they are connected.

The degree of Master of Arts will be conferred upon students who complete with credit an approved course of one year and present a satisfactory thesis.

Every facility for the study of special branches will be given to properly prepared students who are not candidates for a degree, as also to those who, having already attained to the Doctor's degree (here or elsewhere), wish to continue mathematical study or investigation.

MATERIAL FACILITIES

The library is provided with the more important textbooks, treatises, and memoirs on the various branches of mathematics, as well as the principal journals and transactions of learned societies that are devoted to any considerable extent to mathematics. A list of these journals will be found below.

The mathematical department possesses a good collection of models, a Thomas arithmometer, and an Amsler planimeter with revolving table.

LIST OF JOURNALS RELATING TO THE EXACT SCIENCES IN THE UNIVERSITY LIBRARY

(On account of the European war some of the foreign journals marked "to date" are incomplete.)

AMSTERDAM.

Koninklijke akademie van wetenschappen. Verhandelingen, 1854 to date. Complete.

Revue semestrielle des publications mathématiques. 1893 to date. Complete.

BALTIMORE.

American chemical journal. 1879 to date. Complete.

American journal of mathematics. 1878 to date. Complete.

Bangkok.

Siam society. Journal. 1905-07.

Berlin.

Berliner mathematische Gesellschaft. Sitzungsberichte. 1902 to date. Complete.

Chemisches Centralblatt. 1897 to date. Complete.

Deutsche chemische Gesellschaft. Berichte. 1868 to date. Complete.

Fortschritte der Physik. 1847 to date. Complete.

Jahrbuch über die Fortschritte der Mathematik. 1868 to date. Complete.

Journal für die reine und angewandte Mathematik. 1826 to date. Complete.

Königlich-preussische Akademie der Wissenschaften. Mathematische und naturwissenschaftliche Mittheilungen aus den Sitzungsberichten. 1882-97. Complete.

Zeitschrift für angewandte Chemie. 1888 to date. Complete.

Bologna.

Istituto di. Bologna. Reale academia delle scienze.

Commentarii. 1731-1791. Complete.

Novi commentarii. 1834-1849.

Memorie fis. e mat. 1806-1910.

Memorie. 1850 to date. Complete.

Scientia; rivista di scienza. 1910 to date. Complete.

Boston.

American academy of arts and sciences. Proceedings. 1870 to date. Complete.

North American Review. 1815–1886.

Technology review. 1899 to date. Complete.

Boulder, Colorado.

University of Colorado. Studies. 1902 to date. Complete.

Braunschweig.

Deutsche physikalische Gesellschaft. Berichte. 1903 to date. Complete.

Jahresbericht über die Fortschritte der Chemie. 1847 to date. Complete.

Breslau.

Kaiserlich-Leopoldinisch-carolinische deutsche Akademie der Naturforscher. 1843.

Bruxelles.

Académie royale des sciences des lettres et des beaux-arts de Belgique.

Bulletins. Ser. 3. 1889 to date.

Mémoires couronnés et mémories des savants étrangers. 1889-90.

Cambridge, England.

Cambridge philosophical society.

Proceedings. 1843 to date. Complete.

Transactions. 1822 to date. Complete.

Cambridge, Massachusetts.

Science. 1883 to date. Complete.

Charlottesville, Virginia.

Annals of mathematics. 1884 to date. Complete.

Chicago.

Astrophysical journal. 1895 to date. Complete.

School science and mathematics. 1901 to date. Complete except vol. 13, Nos. 1-2.

Terrestrial magnetism. 1896 to date. Complete.

Columbia, Missouri.

University of Missouri studies. Science series. vol. 1. 1905-07.

Dresden.

Zeitschrift für Chemie und Industrie der Kolloide. 1906 to date. Complete

EASTON, PENNSYLVANIA.

- American chemical society.
  - Chemical abstracts. 1907 to date. Complete.
  - Journal. 1879 to date. Complete.
  - Proceedings. 1878 to date. Complete.
  - Journal of industrial and engineering chemistry. 1909 to date. Complete.

EDINBURGH.

- Edinburgh mathematical society. Proceedings. 1884-1907.
- Edinburgh philosophical journal. 1819-1826.
- Edinburgh royal society transactions. 1873 to date. Complete.

GÖTTINGEN.

- Königliche Gesellschaft der Wissenschaften. Nachrichten von der k. Gesellschaft der Wissenschaften und der Georg-Augusts-universität. 1853 to date.

GREIFSWALD.

- Archiv der Mathematik und Physik. 1901 to date.

HAARLEM.

- Hollandsche maatschappij der wetenschappen. Archives néerlandaises des science exactes et naturelles. 1866 to date. Complete.

HALIFAX.

- Nova Scotian institute of science.
  - Proceedings and transactions. Halifax. 1890 to date. Complete.

HALLE.

- Zeitschrift für Electrochemie. 1895 to date. Complete.

HAMBURG.

- Mathematische Gesellschaft. Mittheilungen. 1890 to date. Complete.
- Zeitschrift für anorganische Chemie. 1892 to date. Complete.

HEIDELBERG.

- Annalen der Chemie. 1832 to date. Complete.

INDIANAPOLIS.

- Indiana academy of science. Proceedings. 1895-98.

ITHACA.

- Journal of physical chemistry. 1896 to date. Complete.

LAWRENCE, KANSAS.

- Kansas University science bulletin. 1902-1908.

LEIPZIG.

- Acta Eruditorum, 1682-1731. 50 vols. Supplementa, 1692-1734. 10 vols. Indices generales, 1693-1733. 10 vols. in 5.
- Nova Acta Eruditorum, 1732-1782. 13 vols. Supplementa, 1735-1739. 3 vols. in 2.
- Annalen der Physik. 1824 to date. Beiblätter, 1889 to date. Complete.
- Archiv für Optik. vol. 1. 1908.
- Chemische Novitäten. 1905-08.
- Deutsche Mathematiker-vereinigung. Jahresbericht. 1890 to date. Complete
- Encyklopädie der mathematischen Wissenschaften mit Einschluss ihrer Anwendungen.
- Fortschritte der Chemie, Physik und physikalischen Chemie. 1909.
- Internationale Mathematiker-congresse. Verhandlungen. 1897 to date. Complete.
- Jahrbuch der drahtlosen Telegraphie und Telephonie. 1908 to date. Complete
- Jahresbericht über die Leistungen der chemischen Technologie. 1856 to date. Complete.

LEIPZIG (Continued).

Journal für praktische Chemie. 1834 to date. Complete.

Königlich-sächsische Gesellschaft der Wissenschaften.

Berichte über die Verhandlungen der mathematisch-physischen Classe. 1849 to date. Complete.

Abhandlungen der mathematisch-physischen Classe. 1852 to date. Complete.

Mathematische Annalen. 1869 to date. Complete.

Zeitschrift für Chemie. 1866-71.

Zeitschrift für Mathematik und Physik. 1856 to date. Complete.

Zeitschrift für physikalische Chemie. 1887 to date. Complete.

Zeitschrift für mathematische und naturwissenschaftliche Unterricht. 1903 to date.

Zeitschrift für wissenschaftliche Photographie, Photophysik und Photochemie. 1903 to date. Complete.

LIÈGE.

Société royale des sciences. Mémoires. 1843 to date. Complete.

LONDON.

British academy. Proceedings. 1905. 1907.

British association for the advancement of science. Reports. 1831 to date. Complete.

Chemical news and journal of physical science. 1904 to date. Complete.

Chemical society of London.

Annual reports on the progress of chemistry. 1905 to date. Complete.

Journal. 1849 to date. Complete.

Electrician. 1891 to date. Complete.

International catalogue of scientific literature. 1902 to date. Complete.

London mathematical society. Proceedings. 1865 to date. Complete.

Royal Society.

Proceedings. 1800 to date. Complete.

Philosophical transactions. 1665 to date. Complete.

Mathematical gazette. 1896 to date. Complete.

Nature. 1870 to date. Complete.

Nineteenth century. 1877 to date. Complete.

Philosophical magazine. 1798 to date. Complete.

Physical Society of London. 1876 to date. Complete.

Quarterly journal of pure and applied mathematics. 1857 to date. Complete.

Quarterly review. 1809-1885.

Science abstracts. 1898 to date. Complete.

Science progress in the 20th century. 1907 to date. Complete.

MADISON.

Wisconsin academy of arts and sciences. Transactions. 1898.

MANILA.

Philippine journal of science. 1906 to date. Complete.

MILANO.

Annali di matematica, pura ed applicata. 1889 to date.

Reale istituto lombardo di scienze e lettere. Classe di scienze mathematieech naturali.

Rendiconti. 1864-67. Complete.

Rendiconti. 1868 to date. Complete.

Memorie. 1843 to date. Complete.

Montreal.
- Royal society of Canada. Proceedings and transactions. 1882-1906.
- München.
  - Königlich bayerische Akademie der wissenschaften. Sitzungsberichte der mathematisch physikalischen Klasse. 1871 to date. Complete.

New Haven.
- American journal of science and arts. 1871 to date. Complete.

New York.
- American mathematical society.
  - Annual register. 1892 to date. Complete.
  - Bulletin. 1894 to date. Complete.
  - Transactions. 1900 to date. Complete.
- American society of biological chemists. Proceedings. 1907 to date. Complete.
- Appleton's journal of literature, science and art. 1869-76.
- Electrical world and engineer. 1907 to date. Complete.
- Journal of biological chemistry. 1905 to date. Complete.
- The Minerva. 1824-26.
- New York Mathematical Society. Bulletin. 1891-94. Complete.
- Popular science monthly. 1872 to date. Complete.
- Physical review. 1894 to date. Complete.

Oxford.
- Messenger of mathematics. 1862 to date. Complete.

Palermo.
- Circolo matematico di Palermo. Rendiconti. 1887 to date. Complete.

Paris.
- Annales de Chemie et de physique. 1789-1908.
- Annales scientifiques de l'École normale supérieure. 1864 to date. Complete.
- Association française pour l'advancement des Sciences. Comptes rendus des sessions. 1873 to date. Complete.
- Bulletin des sciences mathématiques. 1870 to date. Complete.
- Bureau international des poids et mesures. 1881 to date. Complete.
- École polytechnique. Journal. 1794 to date. Complete.
- Institut de France. Académie des sciences. Comptes rendus hebdomadaires des séances. 1835 to date. Complete.
- Journal de mathématiques pures et appliquées. 1836 to date. Complete.
- L'éclairage électrique. 1894-1907.
- L'enseigmement mathématique. 1899 to date. Complete.
- Nouvelles annales de mathématiques. 1842 to date. Complete.
- Revue des deux mondes. 1908 to date. Complete.
- Revue générale des sciences pures et appliquées. 1903 to date. Complete.
- Revue scientifique. 1863 to date. Complete.
- Société chimique de Paris. Bulletin. 1858 to date. Complete.
- Société mathématique de France. Bulletin. 1873 to date. Complete.

St. Petersburg.
- Journal of physical chemistry. (Russian Text.) Chemical section and physical section. 1909 to date.

Philadelphia.
- Academy of natural sciences of Philadelphia. Proceedings. 1890 to date. Complete.
- American electrochemical society. Transactions. 1902 to date. Complete.
- Lippincott's magazine of literature, science and education. 1868-1881.

Pisa.

- Il Nuovo Cimento. 1891 to date. Complete.

Rome.

- Reale accademia dei lincei. Atti. Rendiconti. etc. 1847 to date

Sacramento.

- Lick observatory. Publications. 1887-1903.

Salem, Massachusetts.

- American Association for the advancement of science. Proceedings. 1848 to date. Complete.

Sidney.

- Australasian association for the advancement of science. 1888 to date. Complete.

Stockholm.

- Acta mathematica. 1882 to date. Complete.
- Arkiv för matematik, Astronomi och fysik. 1903 to date. Complete.
- Bibliotheca mathematica. 1884 to date. Complete.

Strassburg.

- Zeitschrift für physiologische Chemie. 1877 to date. Complete.

Stuttgart.

- Jarhbuch der organischen Chemie. 1908 to date. Complete.
- Sammlung Chemischer und chemisch-technischer Vorträge. 1896 to date. Complete.

Tokyo.

- Journal of the College of Science of the Imperial University of Japan.
- Mathematico-physical society. Proceedings (Tôkyô sûgakubuturigakkwai kizi). 2nd Ser. 1901 to date. Complete.

Toulouse.

- Université de Toulouse. Faculté des sciences. Annales. 1887 to date. Complete.

Urbana, Illinois.

- University of Illinois. University studies. 1900-1908.

Washington, D. C.

- National academy of sciences.
  - Biographical memoirs. 1877 to date. Complete.
  - Memoirs. 1883-1902.
  - Reports. 1883 to date. Complete.
- U. S. Bureau of Standards. Bulletin. 1905 to date. Complete.
- U. S. Naval observatory. Publications 1900-1903.
- U. S. Naval observatory. Astronomical and meteorological observations. 1885-1889.

Wiesbaden.

- Zeitschrift für analytische Chemie. 1862 to date. Complete.

Wien.

- Kaiserliche Akademie der Wissenschaften.
  - Denkschriften; mathematisch-naturwissenschaftliche Classe. 1850-1908.
  - Sitzungsberichte der mathematisch-naturwissenschaftlichen Classe. 1848 to date. Complete.
- Monatshefte für Mathematik u. Physik. 1908.
- Monatshefte für Chemie und verwandte Theile anderer Wissenschaften. 1881 to date. Complete.

Worcester.

- The Mathematical review. 1896–97.

II. PHYSICS

The Department of Physics of Clark University is exclusively a department for graduate study and research in pure and applied physics. In order to set forth to the intending student the facilities of this department, stress may be laid on a number of points in which it is believed that the conditions here are exceptional.

First, the fact that the attention of the professor is not distracted from the needs of the student by other duties, which, combined with the small number of students in the department, enables an amount of personal attention to be given to each one which is perhaps unique in this country. The head of the department is able to see each student and to give him personal advice in the conduct of his researches or his studies every day if necessary. The facilities without which no graduate department of research in physics can be complete are comprised under three heads: first, a systematic course of lectures in theoretical or mathematical physics; second, a laboratory with a sufficient number of rooms for individual work and with a sufficient equipment of apparatus and an instrument shop for the speedy production of whatever may be necessary for the research in hand; third, a library containing the classic works on physics, with full sets of journals and proceedings of learned societies by which the history of progress, past and present, may be studied, and kept up-to-date by the continual purchase of the latest works. In all these directions the facilities offered by this department invite attention.

The lecture courses are so arranged as to cover in a cycle of two years all the principal subjects and methods of theoretical physics. The pursuit of them will fit the student to read and study with facility any memoirs on mathematical physics. The courses are so arranged that, although they follow in order, it is possible for a student to begin in either year of the cycle. The regular courses are those not marked with a star, and constitute a course of from five to seven hours weekly. The starred courses are delivered at irregular intervals, according to the demands or the presence of students of sufficient advancement.

LECTURES

1. DYNAMICS. GENERAL PRINCIPLES, EQUATIONS OF LAGRANGE AND HAMILTON, METHODS OF HAMILTON AND JACOBI, SYSTEMS OF PARTICLES, RIGID BODIES.

This course is fundamental for the pursuit of all the others, and includes a detailed account of the principle of Least Action and the differential equations of Lagrange, preparatory to their application to other parts of mathematical physics such as optics and electricity.

2. NEWTONIAN AND LOGARITHMIC POTENTIAL FUNCTIONS. ATTRACTION OF ELLIPSOIDS.

This course is a necessary preliminary to the study of electricity and magnetism, of hydrodynamics, and of the figure of the earth.

3. ELASTICITY, HYDRODYNAMICS, WAVE AND VORTEX MOTION, DYNAMICAL BASIS OF SOUND AND LIGHT.

This course is the basis of applications of the theory of wave motion to sound, light, electro-magnetism, and earthquake waves, and to the study of meteorology.

3a. * DYNAMICS OF CYCLIC AND OSCILLATORY SYSTEMS, WITH APPLICATIONS TO THE THEORY OF ELECTRICITY, SOUND AND LIGHT.

The substance of the preceding courses is contained in Professor Webster's Treatise on Dynamics, B. G. Teubner, Leipzig.

3b. * THE THEORY OF RESONANCE AND OF GENERALIZED IMPEDANCE WITH APPLICATIONS TO THE MEASUREMENT OF SOUND AND TO WIRELESS TELEGRAPHY.

This course takes up Professor Webster's original researches in acoustics, and also shows how the methods there employed bear on the fundamental electrical phenomena involved in wireless telegraphy.

4. Electricity and Magnetism. The Classical Theories and the Theory of Maxwell, with an account of the principal methods for the solution of problems and applications to absolute measurements.

The substance of this course is found in Professor Webster's Mathematical Treatise on the Theory of Electricity and Magnetism, London, Macmillan & Co.

4a. * Recent Developments in Electrical Theory, including the Theory of Lorentz and the Principle of Relativity.

The application to the theory of electrons and to the optics of bodies in motion.

5. The Theory of Light. Propagation of Light, Diffraction, Reflection and Refraction, Dispersion, Double Refraction, Polarization, Metallic Reflection, Magneto-optics, X-rays and Crystals.

5a. * Comparison of Theories of the Ether.

Critical and historical examination of the various mechanical explanations of the luminiferous ether, including those of Green, McCullagh, Kelvin, Maxwell, Sommerfeld and Larmor.

5b. * Geometrical Optics. Properties of Systems of Rays, and their Various Aberrations. Hamilton's Characteristic Function or Eikonal. Applications to Optical Instruments.

6. Thermodynamics. Thermo- and Electro-Chemistry.

The establishment of the two laws of thermodynamics, and their application, by means of the methods of Gibbs and Helmholtz, to the examination of physical and chemical phenomena. Application to heat-engines, including steam, gas, and oil engines, the flow of gases and vapors, and the steam turbine. The conditions of chemical equilibrium, phenomena of electrolysis, osmotic pressure, and capillarity. Nernst's Theorem.

7. The Kinetic Theory of Gases. The Maxwell-Boltzmann Theorem and the Elements of Statistical Mechanics.

8. * The Theory of Radiation and of a Black Body.

The relations obtained from the laws of Kirchhoff, Stefan, Wien, and Planck, by the recent applications of thermodynamics.

9. * The Phenomena of Conduction of Electricity in Gases, and of Radioactivity, and their Bearing on the Structure of the Atom.

10. The Partial Differential Equations of Mathematical Physics.

Laplace's Equation, Equation of Thermal and Electrical Conduction, Equation of Wave-motion, Helmholtz's Equation, Lorenz-Beltrami

Equation, Telegrapher's Equation, and their special cases; methods of Cauchy, Green and Riemann-Volterra; Normal functions, Developments in Series, Fourier's Series, Legendre's, Laplace's, Bessel's and Lamé's functions.

This course is one of the most important for the physicist, and treats a great variety of subjects from the most varied fields, grouping them all into a connected system, and embracing all the methods of theoretical physics.

11.* THE ELEMENTS OF INTEGRAL AND INTEGRO-DIFFERENTIAL EQUATIONS, AND THEIR APPLICATION TO MATHEMATICAL PHYSICS.

12.* SELECTED CHAPTERS IN THE APPLICATION OF THEORETICAL PHYSICS TO COSMICAL PHENOMENA, INCLUDING PROBLEMS IN GEODESY, THE TIDES, METEOROLOGY, SEISMOLOGY, AND TERRESTRIAL MAGNETISM.

13.* LINEAR DIFFERENTIAL EQUATIONS.

The applications of the theory of functions to the linear differential equations of the second order which arise in mathematical physics.

14.* ORTHOGONAL SURFACES AND CURVILINEAR COÖRDINATES AND THEIR APPLICATIONS.

The courses for 1918-19 will be 1, 2, 3, 4.

In addition to the above formal courses there is held a weekly Colloquium, or meeting for the informal discussion of subjects not treated in the lectures, and for the presentation by the students of reports on important articles appearing in the journals. A part of the work of the colloquium consists in the systematic presentation of certain classical researches, more or less connected with the lectures, in preparing which the students make use of the original sources of information, thus gaining much acquaintance with the methods of the masters in research. The work of the colloquium has an excellent effect in training students to present their ideas in a systematic manner before an auditory.

Among the various lines of investigation now attracting the attention of physicists the following are preëminent in importance. First, the interrelations between the luminiferous ether and ordinary matter, and the modifications necessary to be made in Maxwell's theory in order to explain the known optical and electrical phenomena of bodies in motion, and that aspect of the theory which deals with the properties of the small electric bodies known as electrons. This portion of mathematical physics is extremely new, and has hardly begun to appear in university courses in this country. Second, the structure of the atoms of matter, to which the subjects of spectroscopy and the new and fascinating field of radio-activity give the most promising clew. Third, the thermodynamics of radiation in general, which is most intimately connected with the first, and about which a similar remark may be made as to the lack of instruction.

Of branches of applied physics now awaiting the attention of the mathematical physicist may be mentioned meteorology, seismology, and geophysics in general, in all of which the accumulation of experimental data is ahead of the development of theory, to such an extent in meteorology that Professor Arthur Schuster has said that it would be advisable to suspend all meteorological observations for the next ten years, until the theory should have in some degree caught up with the mass of information already accumulated. The theory of meteorology depends on complicated applications of hydrodynamics and thermodynamics; so as to make great demands upon the mathematical physicist, but the field is a rich one to him possessed of the skill to cultivate it. The study of earthquake phenomena is one that is now becoming of great importance in this country, while the investigation of terrestrial magnetism has lately made great advances.

It is almost obvious to the trained investigator that no one can expect to become a physicist of the first rank without a thorough training in mathematical physics, as without that the results of experiment will never be collected into a coherent system worthy the name of an exact science. Furthermore all mathematical physics must rest upon mechanics, the principles of which are of an importance transcending that of any other branch of natural science. It is for this reason that the courses in physics in this department begin with mechanics, and are developed progressively in a systematic manner. They have the advantage of having been deliberately planned for the needs of students of pure physics, as experience has shown them to be prepared by the various colleges, and of being all delivered by the same person, so that logical consistency and continuity of method are assured. The waste of time often incurred by repetitions of the same subject and of changes of notation by various instructors is thus totally avoided. Attention is called to the fact that *no branch of physics is left unprovided for in the course of lectures.*

The aim of the department is to insure in its students some acquaintance with all the various fields of experimental physics, to develop in them the power of exact measurement, to accustom them to exact reasoning from experiment to theory, and to encourage original research conducted on a sound basis. To this end students will be put to work in the laboratory upon experiments of sufficient difficulty to give them skill in measurements of precision, and to enable them to become familiar with the precautions and corrections necessary to be employed in exact work. After a sufficient amount of experience has been gained, and the student has shown himself to be possessed of sufficient originality to warrant independent investigation, he will be encouraged to take up for himself an original research in the hope of making a personal contribution to science. In this research he will have at all times the benefit of the direction and advice of the professor.

It should be urged upon intending students to prepare themselves, not only in ordinary laboratory measurements, but also in mathematics, the lack of proper mathematical preparation being a serious drawback to the appreciation of the lectures. In particular may be recommended for study not merely those portions of the calculus which deal with the working out of many indefinite integrals, etc., but the theoretical portions which deal with the ideas of partial derivatives, definite integrals, and their practical manipulation, together with enough analytic geometry to involve the properties of lines and *surfaces* of the second order, and a fair amount of the elements of determinants. As suitable text-books for preparation may be recommended to the student Lamb's, Osgood's or Gibson's Calculus, C. Smith's Analytical Geometries, and Muir's or Hanus's Determinants. Appell, *Eléments de l'analyse mathématique* may be very strongly recommended to the intending student for study before and during his course at the University.

It cannot be too strongly urged that the student should, from the beginning, be able to read French and German with ease and to make use of works in them.

REQUIREMENTS FOR THE DOCTOR'S DEGREE

1. The ability to read at sight specimens of scientific French and German, tested before the first of November preceding the Doctor's examination by a committee of two members of the Faculty.

2. The successful passing of an examination upon the general subject of Experimental Physics[1] and upon the subjects named above in the regular course in Theoretical Physics, as a major requirement, together with an examination in one minor subject, *to be determined in each particular case by the head of the Physical Department.* This subject will be Mathematics or Chemistry.

3. The presentation of a satisfactory dissertation, involving a substantial amount of original work, and forming a contribution of value to pure science. The presentation of the dissertation is a prerequisite to examination. The time of residence necessary for the proper fulfilment of the above requirements will generally be at least three years, of which at least one will be very largely devoted to work on the dissertation. Students will not be encouraged to enter upon the work of a dissertation until they have acquired sufficient experience to enable them to specialize with advantage.

The aim of the department is to produce physicists rather than electricians, acousticians, opticians, engineers, or narrow specialists of any sort, for although in the nature of things one will be obliged to know more of one subject than of others, yet it seems evident that no thorough knowledge of any branch can be gained without a comprehensive view over the whole subject. Without this the specialist, or the experimentalist lacking a knowledge of mathematics, will continually be falling into pitfalls which the more wary avoid. Furthermore it can be but a detriment to science to encourage research in new fields by immature and ill-prepared minds and hands.

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[1] Every student is recommended to provide himself with Winkelmann's *Handbuch der Physik* as a work for continual reference.

The following statement is here inserted for the benefit of students of mathematics.

The minor in Mathematical Physics consists of the subject-matter of courses 1, 2, 3, and 10, which are intended to constitute the equivalent of five hours a week for one year. Course 10 is given in alternate years to the other courses. The subject-matter of the course is contained in Dr. Webster's treatise on *Dynamics* and his work on Partial Differential Equations, now in press.

THE LABORATORY

The laboratory occupies three floors of one wing of a large well lighted building free from disturbances, and admirably adapted to the purposes of a physical laboratory. On the ground floor is a room extending across the end of the building forty-five feet long by twenty-two feet wide, with windows on three sides, above which are three similar rooms. A lift running from the bottom to the top floor affords means of transporting apparatus, while its shaft furnishes space for manometer or barometer tubes. In the lower room are four piers with heavy stone tops, and two others below the floor on which can be placed heavy tables.

Also on the ground floor is a large dark room, partially below ground, in which the temperature is tolerably constant, containing a very large and heavy pier. The engine and storage-battery room contains a kerosene engine and dynamo on the same foundation and sixty storage cells of ten amperes capacity, constituting the power-supply. The engine may be started at a few moments notice, even at night, but has been superseded for most purposes by a motor-generator which is driven by an external supply and furnishes all needed direct current. The storage cells are conveniently arranged so that each one is accessible from each side, from above and below, and the ventilation is excellent, while the room is as light and clean as the work-rooms. Distributing switchboards allow the current from the dynamo or any section of the battery to be supplied to any of the rooms. On the same floor are three rooms constituting the workshop, one of the most important parts of a research department of physics. The first room is devoted to wood-working and pattern-making, and accommodates also a bench for soldering. The next room contains the machinist's bench, two engine-lathes and drill-press, and the third room a Rivet precision bench-lathe, jeweler's lathe and Brown & Sharpe universal milling-machine. There is no countershafting in the building, each tool being driven by a separate electric motor, so that perfect quiet and steadiness are ensured. In the shop are executed all repairs and alterations of apparatus, and the new apparatus requiring continual experiment is constructed. Most of the principal pieces of apparatus belonging to this department have been thus constructed. In this manner, by having a mechanic always present, an extremely great economy in time and money is effected, and vexatious delays, which would otherwise completely arrest the progress of the work, are avoided. Facilities and encouragement are given to the students to construct apparatus for themselves.

On the main floor are the lecture room, the director's office, the large room used as the director's private laboratory and apparatus room, and three other convenient rooms for research. Two of these are arranged so that they may be darkened for photography, and one is heavily padded with felt for acoustical researches. The large room on the top floor is diagonally divided into two, one dark and devoted to the Rowland twenty-foot diffraction grating and other spectroscopic apparatus, and with a photographic dark room attached. Close by is a high potential battery of two thousand small storage cells. Every room in the laboratory contains sinks, gas and electric light connections, and several circuits connecting with the switch-board in the battery-room.

The laboratory is well equipped with apparatus for research, besides having the facilities above described for the construction of instruments of any sort needed for that purpose. In addition may be mentioned a large collection of diagrams illustrative of mathematical physics, many of them being originals of the figures in Professor Webster's "Electricity and Magnetism" and "Dynamics," and a number of interesting models used in teaching dynamics, thermodynamics, and electricity. Among them are Maxwell's Dynamical Top and a number of other interesting tops, Maxwell's and Rayleigh's induction models, Gibbs's, van der Waals's and other thermodynamical surfaces. This collection of drawings and models can probably not be matched in this country, and is continually being increased.

The laboratory affords so much space that it is rarely necessary to put more than one student in a single room. Every student receives personal attention in the laboratory from the professor whenever he needs it, and is continually in receipt of instruction and suggestion by personal contact, the best form in which information can be imparted. Emphasis should be laid on the advantage to the research student of the contact with a professor who has no other duties or interests than the furtherance of research, in an institution devoted to this as its main object.

In the library Clark University has one of its strongest features. With a large separate building, administered in the most liberal manner with a view to the advantage of the research student, and with ample funds for the purchase of books, its facilities in the Department of Physics can hardly be surpassed. It may be said to contain all of the most important works in many languages, and is continually kept up-to-date, any book wanted needing only to be mentioned to be procured. The library is particularly rich in journals, among which are included the transactions of the learned societies of England, France, Germany, Italy, Austria, Holland, and Belgium. Other sets are being continually added. A list of journals will be found on pages 46–51. There are few subjects connected with physics which may not be thoroughly studied in this library.

III. CHEMISTRY

It is the purpose of the Department of Chemistry to provide the student with that broad training in the fundamental principles of chemistry which shall adequately equip him for a subsequent scientific career.

A considerable proportion of the students entering this Department naturally look forward to an academic career. It is not intended, however, to provide training for such men alone; for the equipment for technical research, whether for public or private interests, requires equally a thorough familiarity with the fundamental underlying principles of science and with the methods of experimental investigation.

Whether a student shall devote himself to pure or to technical research is a matter of individual interest and inclination rather than of training. The purpose of the Department is to provide the training on lines sufficiently broad to enable the student to exercise a choice between technical and purely scientific work.

REQUIREMENTS

In addition to the formal requirements for entrance to the University, the student entering the Department of Chemistry should have a thorough knowledge of the fundamentals of chemistry, including general chemistry, qualitative and quantitative analysis, organic chemistry, and the elements of physical chemistry. The student should also have had mathematics through the elements of the calculus, and not less than two years' work in physics, including general physics, the elements of thermodynamics with labo-

ratory work in heat, and the elements of the theory of electricity and magnetism with laboratory work in electrical measurements.

Students entering this Department, who have not had the work in both physics and mathematics as outlined above, will be expected to make up the deficiency during their first year. Excellent courses in these subjects, which are open to University students, are offered in the College. Students whose training in chemistry falls below the requirements as above outlined, but who have had more extended courses in physics and mathematics may be allowed to enter the Department on condition that any deficiencies in chemistry will be made up during the first year.

A reading knowledge of French and German is indispensable for advanced work in chemistry.

Students who have done graduate work in other universities may enter the Department of Chemistry, receiving credit for residence (excepting the last year), provided the work done has been of such character as to provide the student with the necessary training.

INSTRUCTION

In order that a student may receive a broad training in chemistry, it is necessary that his time be properly distributed between class room work, research work, and library work. The Department endeavors, therefore, to keep the student occupied with these three lines of effort, without exclusion of one or more of them.

The following courses of instruction are offered:

1. Theoretical Chemistry I. Dr. Kraus. Lectures, conferences and problems. After developing the fundamental conceptions of thermodynamics, a study is made of systems comprising phases of constant composition. This is followed with a study of gaseous equilibria and

heterogeneous equilibria in systems comprising phases of constant composition.

2. Theoretical Chemistry II. Dr. Kraus. A continuation of the preceding course. The Nernst Heat Theorem is first examined together with allied matters. This is followed by a study of equilibria in systems comprising any number of phases of variable composition including electrolytic solutions. This course extends over two years.

3. Inorganic Chemistry. Dr. Kraus. This course consists of conferences in which the various elements and their compounds are discussed. The students are given numerous references to the literature. It is intended here to familiarize the student with the properties of matter in its more important forms and to bring his knowledge down to that of the current literature. Both physical and chemical properties are considered. This course thus becomes supplementary to the two preceding ones. It extends over three years.

4. The Phase Rule. Dr. Kraus. Conferences with references to the literature. A study is made of one, two and three component systems including both metallic and non-metallic substances.

5. Dispersed Systems. Dr. Kraus. Conferences with references to the literature. This course is devoted to the study of colloids and of surface phenomena in general.

6. Photochemistry. Dr. Kraus. Lectures and conferences. A study is made of the influence of radiations on chemical reactions.

7. The Process of Electrical Conduction. Dr. Kraus. Lectures and conferences. A detailed study is made of the conduction process in gases, electrolytic solutions, fused salts and metals.

8. Properties of Radioactive Elements. Dr. Kraus. Lectures and conferences. This course is devoted to a study of radioactive substances and the radiations accompanying their transformations.

9. History of Chemistry. Dr. Merigold. A course of lectures accompanied by supplementary reading. This course is intended to cover the historical development of the science in both practical and theoretical aspects. An attempt is made to give the student some knowledge of the individuality of the men whose work has resulted in the growth and development of modern chemistry. Attention will be given also to the relation of chemistry to other sciences at various periods of development.

10. Advanced Analytical Chemistry. Dr. Merigold. In this course will be considered special features of analytical chemistry, both

practical and theoretical. The work will include such topics as special analytical methods with particular reference to sources of error, limits of accuracy, and theoretical considerations; methods of exact analysis required in atomic weight work and other fields of research necessitating precise analysis. Particular attention is paid to results of recent investigation in this field.

11. ORGANIC CHEMISTRY. Dr. White. Conferences are held at which the fundamental conceptions and problems of organic chemistry are dealt with in a systematic way. Current literature, applicable to the subjects under discussion, is reviewed. The course extends over three years.

12. RESEARCH CONFERENCE. Dr. Kraus. This course is devoted mainly to a discussion of investigations which are being carried out in this laboratory.

13. GLASS BLOWING. Dr. Kraus. A brief course in the manipulation of glass, quartz, etc.

Courses 1, 2, 3, 5, 6, 7, 10, 11, 12 and 13 are given during the present year. (Courses 1, 2, 3, 4, 7, 8, 11, 12 and 13 will be given during the year 1918–1919.)

MINOR SUBJECT. Students choosing chemistry as major subject will be expected to take a minor in mathematics, physics, or biology. The choice of a minor subject will be made with reference to the student's previous preparation and to his ultimate aims as an investigator.

RESEARCH. In order that the student may become familiar with the methods of research and gain a knowledge of the minute details of one or more branches of chemistry he will carry on one or more researches throughout his three years of residence. Such researches will in all cases be in part experimental in nature. The subject for research may be one suggested by the student or one suggested by the instructor. In any case, the different investigations carried on in the laboratory at any one time will be largely diversified in order that the students may come into intimate contact with as many branches of chemistr as possible.

Since the student's early investigations will in all likelihood be more or less determinative of the subsequent trend

of his scientific activities, his subject for research is chosen with much care and, if possible, he is given several subjects during the course of his three years' work in the laboratory. In addition he is expected to make himself thoroughly familiar with the details of the investigations of his fellows in the laboratory.

LIBRARY WORK. It is essential that the student shall acquire an adequate contemporaneous knowledge of the entire field of chemistry. This can be done only by reference to the original literature, both past and current. He is expected, therefore, to devote a considerable portion of his time to familiarizing himself with the journals, periodicals, and other important sources of information available in the Library. The various courses are given in such manner as to lead the student on in this direction.

FACILITIES

LABORATORIES. The Chemical Laboratories occupy the third floor of one wing of the Science Building. The floors below are occupied by the Collegiate Department of Chemistry. In addition to store rooms, offices and the Directors' Laboratory, room is provided for nine investigators. Not more than two students are assigned to one laboratory.

Owing to the crowded condition of the present quarters a new laboratory is in project This will consist of a three story building approximately 43 x 69 feet, comprising seventeen individual research laboratories, together with shop, storerooms, offices and conference room. Its construction is to be undertaken as soon as normal conditions return.

In addition to the usual equipment of a chemical laboratory, the following apparatus may be mentioned as being available for research work: A special water still for "conductivity water;" a 2-kilo balance, sensitive to one-tenth milligram; a Hilgar quartz spectograph; a Pulfrich refractometer; a Leeds and Northrup conductance apparatus, including a bridge, air condenser, telephone, and oscillator, and two one hundred and eleven thousand ohm resistance boxes (Curtis's wound); a ten thousand ohm resistance box in steps of one-tenth ohm, a Leeds and Northrup New High Sensitivity Galvanometer, several less sensitive D'Arsonval Galvanometers, a Leeds and Northrup Potentiometer, a platinum resistance thermometer together with bridge, several large capacity vacuum pumps giving pressures as low as 0.00005 mm., thermostats, motors, vacuum jacketed tubes, McLeod gauges, etc.

Through the courtesy of the American Academy, there has been placed at the disposal of the Department a specially constructed assay balance sensitive to one one-thousandth milligram provided from the Warren Fund and an automatic refrigerating machine provided from the Rumford Fund.

The Department is provided with a laboratory shop which includes a grinding wheel and bench lathe with accessories, engine lathe, drill-press and a complete equipment of small tools. The Physics Department has a well equipped shop with a competent mechanician in attendance whose services may be arranged for when required. The laboratory shop is primarily intended to be used when its use serves to save time. The shop is also equipped with an oxy-acetylene welding outfit.

Since glass apparatus forms a large part of the necessary equipment for research, the laboratory provides a complete stock of glass tubing. This includes ordinary soda glass in all sizes, which is used chiefly for glass blowing exercises; a complete stock of lead glass employed in the construction of apparatus; a stock of special glass of coefficient 3.5×10^{-6}, which is employed in apparatus where the conditions of use are especially severe. In addition there is available an unusually good stock of transparent quartz tubing, as well as of electro quartz.

A complete stock of all ordinary supplies, such as stopcocks, stoppers, rubber tubing, quartz ware, etc., is always kept on hand.

The Department is always ready to purchase special apparatus or materials required for research work, while the equipment of permanent apparatus is constantly being added to.

THE LIBRARY. The library facilities which the University affords to students in chemistry are the best obtainable. Complete sets of journals and periodicals are kept on file, together with text books, treatises, etc. New books are placed on display on the library tables and such as are of value are ordered on request.

The student has free access to the shelves and files. Tables are assigned in proximity to the book shelves where the student may leave permanently books and papers with which he is engaged. A more detailed description of the library facilities will be found elsewhere.

SCHOLARSHIPS AND FELLOWSHIPS

A considerable number of scholarships and fellowships are available for students in this Department under conditions set forth elsewhere.

DOCENTS AND HONORARY FELLOWS

Docents and Honorary Fellows are appointed under the conditions as set forth elsewhere. The Department welcomes such men as have already obtained their Doctor's degree and who for one reason or another wish to devote themselves for some time to research work. Every facility and encouragement will be afforded such men for the furtherance of their work.

DEGREES

MASTER OF ARTS. The formal requirements for this degree do not necessarily include an original investigation on the part of the candidate. However, the candidate must demonstrate that he possesses a working knowledge of the fundamental elements of the Science of Chemistry. Obviously, in the case of a science so largely founded on experimental facts as is chemistry, the power to carry on an experimental investigation constitutes one of the most simple and direct means for demonstrating that the candidate possesses the necessary scientific qualifications for this degree.

DOCTOR OF PHILOSOPHY. The formal requirements for this degree are given elsewhere. Among other things, they include three years of residence (or its equivalent in other institutions), with attendance on lectures, and the successful completion of an investigation which constitutes a contribution to the Science of Chemistry. The requirements for a degree cannot, however, be fulfilled by merely observing the formal requirements as to residence, attendance on lectures, and the like. On the contrary, while all formal requirements must be scrupulously fulfilled, to receive the degree of Doctor of Philosophy, the candidate must clearly demonstrate that he possesses those scientific attainments which are essential to an active and productive scientific career.

IV. BIOLOGY

The work of the biological department has reference chiefly to the problems of general physiology, *i.e.*, problems dealing with or bearing upon the peculiarities of vital processes as such. In modern physiology living organisms are regarded as material systems having special and highly distinctive characteristics which are subject to analysis by the methods of the exact sciences. The problems presented by the living cell—a system consisting largely of colloidal material and distinguished by the possession of metabolism and other unique peculiarities—are most effectively approached from this point of view, and fundamental progress in general physiology has been due chiefly to the application of the sciences of physics, chemistry and physical chemistry to the analysis of the vital processes. The biological department offers instruction and facilities to those interested in the application of the physical and chemical sciences to the problems of general physiology. Students and investigators in this field will find unusually good opportunities for gaining the requisite knowledge of physics, chemistry and especially physical chemistry, and every effort will be made to correlate their work in these departments with their physiological work. Students of the physiological analysis of the reactions and behavior of normal intact organisms are offered the further advantage of coöperation with the department of psychology. Work in the physiology of development, comparative physiology, general pharmacology and other fields of research in which marine animals are especially valuable may be conducted during the summer at the Marine Biological Laboratory at Woods Hole under

the direction of Professor Lillie, and credit for work done at Woods Hole will be given in Clark University.

The laboratory is equipped with the usual apparatus and materials for work in general physiology. Any additional apparatus, animals or chemical reagents required for the purposes of any special research will be provided wherever possible. The conditions are especially favorable with regard to scientific literature. Complete files of nearly all of the important journals in zoölogy, physiology and biological chemistry are in the library, as well as a large number of special works in these sciences, and literature in other biological fields (botany, medicine) can be procured on short notice.

For admission to the laboratory students should have had adequate previous training in biology, chemistry and physics. Resident men students whose preparation in these subjects is insufficient may remove these deficiencies by taking the courses offered in Clark College. Students desiring to attend lecture courses without taking laboratory work can make special arrangements to do so.

The following courses are offered:

1. FUNDAMENTAL PROBLEMS OF GENERAL PHYSIOLOGY. This course is introductory and will deal chiefly with the physiology of the living cell from a physico-chemical point of view. The subject matter will be divided somewhat as follows: The distinctive characteristics of living as distinguished from non-living matter; chemical composition of the cell; enzyme action; the physico-chemical constitution of the cell; the nature and significance of cell-organization; the importance of the colloidal state in physiological processes; the rôle of electrolytes; the physiology of stimulation, contractility, and related processes; the general reactions and elementary behavior of intact organisms (tropisms, etc.); the general characteristics of metabolic processes (oxidations, syntheses, interchange with surroundings); cell-reproduction, fertilization, development and heredity. DR. LILLIE, *two lectures weekly, October to June.* Students with sufficient preparation will be assigned laboratory work in connection with these topics.

2. SPECIAL PROBLEMS OF GENERAL PHYSIOLOGY. A more advanced

course of lectures will be given on topics of general physiology, having especial reference to the problems under investigation in the laboratory. Hours will be arranged to suit requirements. DR. LILLIE, *October to June.*

3. BIOLOGICAL SEMINAR. The Seminar will meet once a fortnight to present results of research and to review and discuss recent literature. *October to May.*

4. SPECIAL TOPICS IN BIOLOGICAL CHEMISTRY. The aim of this course is to present in greater detail than is usually possible in a more general course, certain subjects of particular interest to students intending to undertake biochemical research. The subject at present offered is organic chemistry with especial reference to compounds and processes of biological interest. The discussions will include the physical and chemical properties of such compounds, their metabolism, and general physiological significance. DR. WHITE. *One lecture weekly, October to June.*

5. GENETICS. A course of one lecture weekly on the methods and problems of genetics is given throughout the year. The data of heredity and variation, the bearing of these data on the problems of evolution, theories of heredity, Mendelian inheritance and its cytological basis, are reviewed in the course. DR. HURLIN. *October to June.*

6. THE PHYSIOLOGY OF MARINE ORGANISMS. The course in General and Comparative Physiology, given in the summer at the Marine Biological Laboratory at Woods Hole under the direction of Dr. Lillie, is also open to properly qualified students in Clark University. Those prepared to do so may undertake research in this field. For further information regarding the work at Woods Hole students are referred to the Annual Announcement of the Marine Biological Laboratory.

V. PSYCHOLOGY

A complete course in Psychology at Clark University includes the following subjects:

1. Anatomy and Physiology of the Brain and Spinal Cord, sense organs, and other parts of the body, including the muscles—the organs of the will—in so far as they are concerned with mental processes—together with a good general background of biology. For this a special laboratory is equipped.

2. Physiological and Experimental Psychology, including the elementary sense-experiences; sensation and perception; the measurement of sensational intensity; space; time; reaction-times; affection and emotion; memory; association; attention; apperception; will; the "higher mental processes;" inter-relation of mind and body. For this a special laboratory is equipped.

3. Comparative and Genetic Psychology. Review of the general doctrine of evolution as a basis for the evolution of mind. Discussion of experimental and observational studies upon typical forms of animal life, beginning with the protozoa. Instincts; animal and human infancy. Childhood and adolescence.

4. Abnormal and Morbid Psychology, as nature's experiments, *e.g.*, border-line phenomena as seen in neurotic subjects, prodigies, and geniuses; defectives, such as the blind, deaf, criminal, idiotic; mental and nervous diseases, epilepsy, phobias, neurasthenia, hysteria; morbid modifications of will, personality and emotion, etc. Special clinical facilities for this work are open to the department in the hospitals and other institutions of the city.

5. History of Psychology and Philosophy, including the chief culture institutions, history of science, medical theories, Christianity, and education generally.

6. Applications of Psychology, Pedagogy, including mental and moral hygiene and regimen, school organization and methods from kindergarten to university; the sex problem; defectives, etc.

7. PSYCHOANALYSIS. Freud, Janet, Jung, Adler and others. The mechanisms are considered less in their applications to sex than to fear, anger and other emotions. The psychoanalysis of great men. Dreams, hypnotism, multiple personality, somnambulism, and the more common forms of neuroses and psychoses, the psychology of everyday life.

The aim of the Psychological Department is to cover this field as well as its instructors are able to do so in two or three years.

The following courses are announced for the academic year 1918–1919.

DR. HALL'S COURSES

Dr. Hall's courses are as follows:

1. THE PSYCHOLOGY OF THE FEELINGS AND EMOTIONS. This course will involve a brief sketch of the history of the theories in this field and a much more extended account of the recent experimental, clinical and genetic work done in this department. The purpose of the course is to give a clear account of the present condition of our knowledge of each of the feelings, one after another, pleasure and pain, fear, anger, sympathy, jealousy, love, hate, etc.

2. PSYCHOGENESIS. This course will begin with an account of the theories of the origin both of life and of mind, with chief emphasis upon the latter. There will be a survey of the results of experimental biology, concerning elemental life or substances that resemble it, then experiments and observations upon the simplest organisms. This will be followed by a résumé of our knowledge of certain typical forms of animal instinct up the series, and upon this basis the contributions to paleontology will be drawn upon and certain lessons as to the development of the instinct of type forms of life; the horse, camel, monkey and other typical forms will be dwelt upon at some length. This will be followed by a brief account of culture stages of the human race from the paleolithic age and that of the troglodytes up.

3. THE PSYCHOLOGY OF RELIGION. This falls into two halves:—first, the origin of religion, from animism and manaism up to the ethnic religions other than the Hebrew and Christian; the latter, focussing in the psychology of Jesus, constituting part two.

4. THE PSYCHOLOGY OF APPETITE, Foods and Nutrition.

5. STUDIES IN HUMAN CHARACTER. This course begins with a consideration of current tests, scales, standards, and passes on to the higher qualities of man and the problems of race, sex, genius, talent, and the more or less systematic attempts that have been made to analyze and compare the original powers of man.

The above outlines indicate Dr. Hall's field, from which special topics will be selected for the courses of the following year. The whole field requires two years, but which of the topics will be stressed during the academic year 1918–1919 will depend somewhat upon the personnel of the psychological group.

6. THE SEMINARY, at Dr. Hall's house, three hours every Monday evening through the year. This seminary has been held nearly every Monday evening, when the University was in session, since its foundation. Each member of it is supposed, during the year, to present a paper upon his thesis or upon some other approved topic, which is later discussed. This serves to pool the special studies of each student for the benefit of the others, while the discussions serve to develop interest and quicken thought.

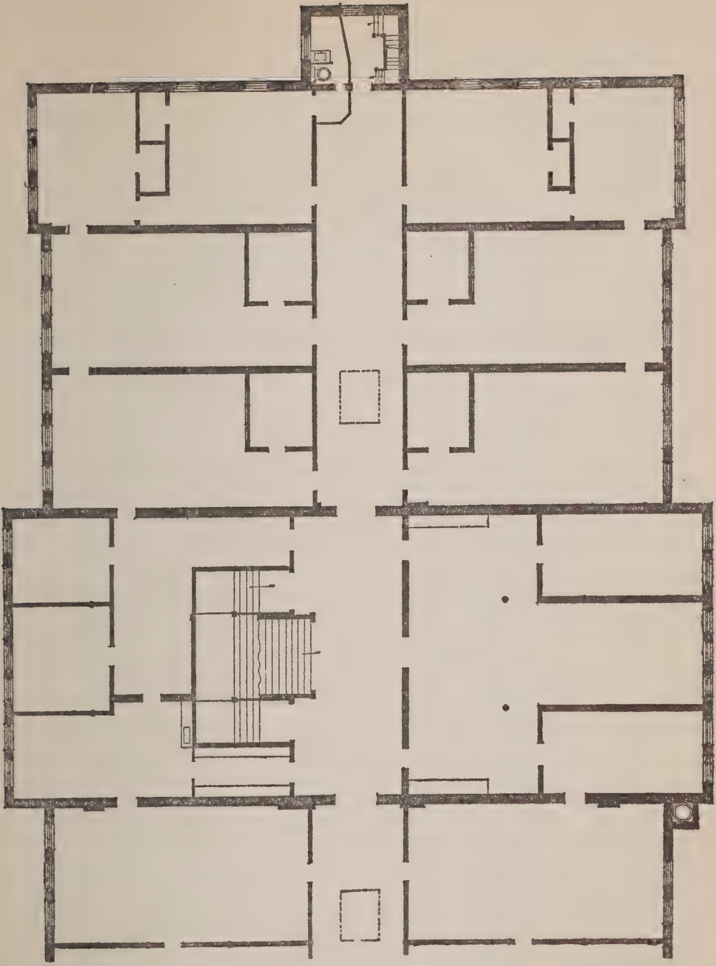
7. Researches with individuals on special topics.

EXPERIMENTAL PSYCHOLOGY

The primary purpose of this department is to train students for the investigation of psychological problems. The lecture courses and the Journal Club aim to familiarize the student with the history and the present status of psychological experimentation; the laboratory courses are arranged with a view to training him in experimental procedure, and equipping him for independent research.

LABORATORY

The psychological laboratory occupies a suite of twenty rooms on the upper floor of the main building of the university. These rooms, as at present arranged, are devoted to the following purposes: office, lecture-room, seminary-room, reading-room, dark-room, work-shop, general apparatus-room, and a group of rooms for research.



PSYCHOLOGICAL LABORATORY

The laboratory is well equipped with general apparatus; and it has an annual appropriation sufficient to provide for the purchase and manufacture of such apparatus as is required from time to time for special investigations. The workshop contains power- and other lathes, a power-drill, and an abundant equipment of tools and materials for the manufacture and repair of apparatus. The services of an expert mechanician are available; and every facility is provided for the devising and constructing of apparatus appropriate for the solution of such special problems as are undertaken.

The library contains an unusually large collection of psychological literature. It is especially well supplied with scientific periodicals and reports of the proceedings of learned societies. Since the enrolment of the department consists exclusively of graduate students, and is, therefore, relatively limited in numbers, it is possible to give to each student of the department a maximum of freedom in the use of the library. Besides having access to the university library, students of the laboratory have at their disposal an excellent working-library of psychological books and periodicals which are shelved in the seminary-room.

The more general and fundamental courses of lectures in the department are repeated each year, while the more advanced and specialized courses are given only in alternate years. A feature of the method of instruction at Clark University is the frequent informal conferences between instructor and student. The Journal Club meets weekly (two-hour sessions) for the discussion of the current literature. The more valuable contributions presented by the members of the Club will be published in the *American Journal of Psychology*. The laboratory work includes an introductory course, an advanced course, an experimental course in statistical methods, and a research course. The former is designed to familiarize the student with the efficient handling of apparatus, and to acquaint him with the methods to be followed and the precautions to be observed in psychological experimentation. This course is repeated each year; it, or its equivalent, is a prerequisite to all other work in the laboratory. The advanced laboratory course is intended to supplement the introductory course; and the course in statistics aims to give to the student a working knowledge of statistical methods. The research varies from year to year.

Provision for Comparative Psychology is now made at the Hadwen Arboretum, about fifteen minutes' walk from the main building of the University, where special facilities for the care of the animals have been provided.

DR. BAIRD'S AND DR. FERNBERGER'S COURSES

[Lieutenant Fernberger has been granted leave of absence for the duration of the war. During his absence from the University his courses will be omitted, excepting in the following cases: The lecture course in General Psychology will be offered by Dr. Baird; the Introductory Experimental Course will be given under the direction of Dr. Baird, Dr. Geissler and Mr. Kurihara; the Advanced Experimental Course will be under the direction of Dr. Baird, Dr. Geissler and Mr. Kurihara.]

1. GENERAL PSYCHOLOGY. A course of lectures and demonstrations dealing with sensation, affection, attention and perception. This course will present, in concrete and systematic form, the more important facts that have been yielded by the experimental investigation of the simpler mental processes, together with a discussion of theories that have been advanced from time to time. DR. BAIRD. *Two hours a week. First semester.*

2. THE NEUROLOGICAL BASIS OF PSYCHOLOGY. An elementary course dealing with the anatomy and physiology of the central nervous system and the organs of special sense. The work will be covered partly by lectures and partly by actual dissection. The central nervous system will be considered from the functional aspect as well as a consideration of the gross and microscopic anatomy. DR. FERNBERGER. *Two hours a week, January to April.*

3. THE APPLICATION OF STATISTICAL METHODS TO PSYCHOLOGY. A course of lectures and demonstrations in which will be considered the calculations necessary for the practice of the psychophysical methods and also the relation between the methods. The distribution of relative frequencies, correlation and similar topics will also be considered. DR. FERNBERGER. *One hour a week. First semester.*

4. LABORATORY WORK IN PSYCHOLOGICAL STATISTICAL METHODS. In this course a limited and selected group of students will be given practice in the actual calculations and in the acquiring of the data that will form the basis for these calculations for the different methods discussed in Course 3. DR. FERNBERGER. *Two or three hours a week. Second Semester.*

5. THE PSYCHOLOGY OF LANGUAGE. A course of lectures dealing with an analysis of the language function, with special reference to the study of the aphasias. In this course will also be considered the anatomical basis of language, the origin of language ontogenetically and phylogenetically considered, as well as such special topics as the psychology of reading. DR. FERNBERGER. *One hour a week. Second Semester.*

6. THE PSYCHOLOGY OF MEMORY, IMAGINATION AND THE PROCESS OF LEARNING. Lectures and demonstrations dealing with the phenomena of mental acquisition and retention; imagery, association and reproduction, the phenomena of learning and forgetting, the function and development of habits. DR. BAIRD. *Two hours a week. Second semester.*

7. THE PSYCHOLOGY OF THE HIGHER INTELLECTUAL PROCESSES. The psychology of meaning, abstraction, thought, judgment, reasoning; the function and significance of imagery; the phenomena of *Bewusstheit*, *Bewusstseinslage*, *Aufgabe*, *Einstellung* and *determinierende Tendenz*. DR. BAIRD. *One hour a week.*

8. HISTORY OF PSYCHOLOGY. An outline of the development of psychological thinking; a statement and discussion of the characteristic features of the systematic doctrines embodied in the writings of representative psychologists, past and present. DR. BAIRD. *One hour a week.*

9. GERMAN TRANSLATION. A course for the rapid reading of a German psychological text. DR. BAIRD. *One hour a week.*

10. COMPARATIVE PSYCHOLOGY. A description and discussion of investigations of animal learning. DR. BAIRD. *One hour a week.*

11. JOURNAL CLUB. A seminary for the informal discussion of current psychological literature. Meetings are held weekly throughout the year.

12. INTRODUCTORY EXPERIMENTAL COURSE. In this course the

student will perform a series of standard psychological experiments, chiefly for the purpose of mastering the technique of experimentation. The course will be given by DR. BAIRD, DR. GEISSLER AND MR KURIHARA. *Four to six hours a week, throughout the year.*

13. ADVANCED EXPERIMENTAL COURSE. The object of this course is to acquaint the student with the technique of some of the more complicated apparatus used in psychological experiments. The use of the plethysmograph, pneumograph, ergograph, tapping experiments, methods of time measurement, methods of presentation of material and the like will be investigated. The student will also become acquainted with all of the special apparatus in the possession of the laboratory. DR. BAIRD, DR. GEISSLER and MR. KURIHARA. *Two hours a week. First semester.*

14. RESEARCH COURSE. Under this title are grouped the special investigations undertaken by students in the laboratory. *Topics and hours to be arranged.*

DR. KARLSON'S COURSES

1. HISTORY OF PHILOSOPHY. The work in philosophy at Clark University is essentially limited to a thorough, though introductory, course, including lectures and texts covering the entire history of philosophy from Thales to Schopenhauer, both inclusive, as fully as can be done in two hours a week. The instructor makes no attempt to teach systematic philosophy, logic, ethics, metaphysics, psychology, or any of the special disciplines, and deals with the history of philosophy in the sense of Zeller, Fischer, Ueberweg, and the rest, in the historic spirit, with some biographical matter, teaching the chief opinions of each important man and then passing to another, and not stressing any of the above specialties. The idea is that the historian should be metaphysician, logician, ethicist, epistemologist, psychologist, etc., just as much as was the man whose system he is expounding for the time, chiefly finishing one author before passing to another, following largely the chronological order, and teaching each system more as literature than as dogma, avoiding indoctrination, and teaching every doctrine or view sympathetically, letting the systems criticize each other, and in general reserving his own criticisms until after his sympathetic presentation has been made, and striving to fit for our examination in such a way that we can plan ultimately to require this course of all who take degrees in psychology or education. *Two hours a week.*

2. Contemporary Philosophy. A discussion of the philosophy since Schopenhauer, dealing chiefly with the Naturalistic, the Idealistic, the Pragmatic, and the Realistic tendencies in present day philosophy. Special emphasis is laid on the philosophy of such men as Haeckel, Nietzsche, Eucken, James, Bergson, etc., and an evaluation of their philosophy is attempted. The relation between philosophy and present day science is also discussed. *One hour a week.*

DR. PORTER'S COURSES

Course in Mental Evolution and Comparative Psychology. Lectures on reflexes, tropisms, instincts, habit-formation, the learning process, and other mental processes in animals. Especial emphasis will be placed on methods of experimental investigation and interpretation of results. The facts and laws of animal behavior and the relation of these to the various branches of human psychology, and other social sciences will be discussed. Some attention will be given to the applications of the findings of the study of Animal Behavior to Nature Study. Lantern slides, charts and demonstrations with apparatus with animals and human subjects. *One hour a week. First semester.*

Course in Social Psychology. Discussions of the rapidly increasing contributions to our knowledge of reflexes, instincts, and conditions of learning in so far as these explain and point to the practical control of social forces and institutions. The results of investigations of individual, comparative, applied, and social psychology are made to contribute to the understanding of the behavior of the individual when he is a member of a group. The chief sources used are: Thorndike's Original Nature of Man; McDougall's Social Psychology; Wallas' The Great Society; Ross' Social Psychology, and Trotter's Herd Instinct in Peace and War. *One hour a week.*

DR. GEISSLER'S COURSE

Psychological Practicum. Experimental demonstrations and practical exercises in the conduct of the most widely employed mental and physical tests and in the application of general intelligence scales after Binet, Goddard, Terman, Yerkes, and others, and of some of the most important educational scales and measurements; discussion of and practice in the mathematical treatment of data obtained by these methods. *One hour a week.*

The following courses offered by Professors James P. Porter and L. R. Geissler in Clark College are open to students in the University:

1. General Psychology. Three hours a week, throughout the year.

2. Social Psychology. Three hours a week, throughout the year.

3. Educational Psychology. Three hours, first semester.

4. Laboratory Course in Experimental Psychology. Three hours a week, throughout the year.

5. Advanced Psychology. Attention, feeling, emotions and will. A lecture and seminar course. Three hours, throughout the year.

At the Hadwen Arboretum, where a "station for the study of animal behavior" has been established and is now under Dr. Porter's direction, are found facilities for the study of certain forms of animal life; and here too will be found some of the illustrative material for his lectures.

PSYCHIATRY

Dr. Cowles, lecturer on Psychiatry, former head of the McLean Hospital at Waverley, Mass., will give a course at the University and the Worcester State Hospital for the Insane. Dr. Cowles's course includes the following topics with clinical demonstrations.

The Melancholia-Mania Group of Neuropsychoses:

1–2. The dependence of Psychiatry upon Mental and General Physiology; the concept of energy fundamental; the reflex arc and integrative action of the nervous system. Relation of inhibition to anabolism, and katabolism.

3. Conduction-paths and Threshold Values: changes in physiological conditions in relation to the determination of psychical effects—normal habit—overuse and disuse—mental symptoms.

4. The Physiology and Pathology of Emotion; depression and exaltation figurative expressions in psychology, both being excitative and katabolic: relations of feeling-tone to conditions of ill-being.

5. Psychasthenia and Neurasthenia; the minor psychoneuroses—psychological automatism, fixed ideas, hysteria.

6. Mental Symptoms of Nervous Exhaustion; their genesis in reductions of functional capacity of the nervous and mental mechanism.

The Deteriorating Psychoses:

7–10. Involution psychoses, paranoia. Dementia praecox, general paresis, senile dementia.

VI. PEDAGOGY

This department offers a course which can be taken for the degree of Doctor of Philosophy. Its work is in the closest connection with that of psychology and anthropology, and in part based on these subjects. The work in this department is intended to meet the needs of the following classes of students.

First. Those intending to teach some other specialty but who wish a general survey of the history, present state, methods, and recent advances in the field of university, professional and technical education.

Second. Those who desire to become professors of pedagogy, or heads or instructors in normal schools, superintendents, or otherwise to become experts in the work of education.

The programme of the Pedagogical Department includes courses or part-courses upon the following subjects:

1. (*a*) CHILD STUDY. (*b*) PEDAGOGICAL PSYCHOLOGY. (*c*) EXPERIMENTAL PEDAGOGY. (*d*) SCHOOL HYGIENE.

2. (*a*) PRINCIPLES OF EDUCATION. (*b*) HISTORY OF EDUCATION AND REFORMS. (*c*) METHODS, DEVICES, APPARATUS, ETC.

3. (*a*) ORGANIZATION OF SCHOOLS IN DIFFERENT COUNTRIES. (*b*) PROBLEMS OF COLLEGE EDUCATION. (*c*) THE TEACHING PROFESSION. (*d*) MOTOR EDUCATION, including manual training, physical education, etc. (*e*) MORAL AND RELIGIOUS EDUCATION. (*f*) IDEALS.

The courses in pedagogy for 1918–1919 will be as follows:

DR. WILLIAM H. BURNHAM'S COURSES

A. THE HYGIENE OF INSTRUCTION. The conditions of brain activity. The laws of stimulation and response. The effects of poisons, especially alcohol, tobacco, caffein and strychnia. Fatigue. The principles of mental hygiene. The laws of nervous activity and the learning process in relation to problems of instruction. The period of study. Recesses. The optimum conditions of school work. The hygiene of the different subjects of instruction. The hygienic aspects of grading, of examinations, of discipline and of punishment. The relation of discipline to mental hygiene. *One hour a week throughout the year.*

B. The Teaching Profession. The essential characteristics of a learned profession. The teacher and the parent. The teacher and the artisan. The teacher in ancient civilization; in China, India, Greece, Rome, etc. The medieval teacher. The teacher of the early Renaissance. The Reformation. The great modern schoolmasters, Sturm, Comenius, F. A. Wolf, Pestalozzi, et al. The teaching profession in Germany. The function of the teacher in social evolution. The function of the teacher in the school-room. Characteristics of the teaching profession as a social group. Fundamental principles concerning the training of teachers. Different plans tried in this and other countries, especially in the training of secondary teachers. The hygiene of teaching. *Once a week, throughout the year.*

C. Seminary. The work will be determined in part by the needs of the students who elect this course. It is hoped that each student will select, after consultation with President Hall and Dr. Burnham, a topic for special investigation. The results of such studies may be published. *One or two hours a week, throughout the year.*

DR. EDMUND C. SANFORD'S COURSE

During the year 1917–18 Dr. Sanford lectured on An Ideal University. The course outlined the fundamental sociological, psychological and pedagogical principles that must be regarded in drawing up a satisfactory system of collegiate studies, and closed with a brief sketch of an ideal university and of an academic college in such a university. *The section met one hour a week during the first half 1917–18.*

The topic of the course for 1918–19 will be *Changes in Higher Education as a Result of the War.* The course will aim to point out the most obvious of the changes which will probably result, or ought to result, from the general reconstructions following the war. *One hour a week, first half year.*

The courses as announced above may be modified somewhat as the needs of the students or other circumstances may require.

THE CHILDREN'S INSTITUTE

The Children's Institute, under the auspices of the Educational Department of Clark University, provides lectures each year, in the small lecture-room on the second floor of the new wing of the library building, from nine to ten o'clock on Saturday mornings, open not only to students but to all others interested. This work varies from year to year. During the present academic year Dr. Amy E. Tanner has lectured upon Child Study.

The Children's Institute has a large hall with three adjacent rooms, comprising one entire floor in the new Library Building devoted to an educational museum, which is equipped with hundreds of maps, charts, diagrams, illustrative and other apparatus gathered from many countries, to ease the work of teaching and make it more effective. This material is used in various departments, but especially by that of Education.

Special attention has been given to the collection of the circulars and other publications of nearly one hundred types of child welfare organizations with which the department seeks to keep in touch.

THE LIBRARY

The library of the department has a large collection of EDUCATIONAL LITERATURE, being especially rich in German and French literature, and having a large number of official reports from various countries—English, French, German, Belgian, Swedish, etc.; also town and city reports, and reports of special institutions; and a collection of French, German, and American text-books.

The books are arranged under the following heads:

1. GENERAL.
2. HISTORY OF EDUCATION.
3. EDUCATIONAL SYSTEMS.

4. The Theory of Education and Special School Subjects.
5. Educational Psychology.
6. Child Study.
7. School Hygiene and Physical Education.
8. Text-Books.
9. Miscellaneous.

Many of the more common educational books are accessible in the Worcester Public Library and have not been duplicated by the University. The large collection of educational text-books in the library of the American Antiquarian Society and its valuable historical material are also accessible to the University.

The collection of educational periodicals includes a large number of the best foreign journals—English, French, German, Swedish, etc.

The nucleus of an educational museum has been formed. This is now merged with the museum of the Children's Institute, and contains a valuable collection of educational apparatus, pictures, illustrative material for language lessons, *Anschauungsunterricht*, toys, kindergarten material, maps, charts, diagrams, text-books, lantern slides, photographs, and illustrative material of various kinds in school hygiene, history, arithmetic, language, the natural sciences, etc. One room contains a collection of apparatus for the teaching of arithmetic, abacuses of various kinds, charts for counting, reckoning machines, number tablets, weights, measures, geometrical models, and astronomical charts and apparatus. Another room contains a collection of toys from different countries, a number illustrating scientific principles in physics and the like. A third room is devoted to apparatus and illustrative material in school hygiene. The collection includes seats and desks, charts illustrating good and bad posture, hygrometers, apparatus for ensuring cleanliness, for testing the air, charts illustrating the incidence of school diseases, the effects of antitoxins, etc., and a sample collection of the antitoxins for the various diseases. The main room is largely filled with pictures, models, maps, charts, and illustrative material for teaching the different school subjects and the different sciences. The catalogue of the department of school hygiene in the museum has been published. A catalogue of the toys has been prepared but not yet published. During the year 1917–18 some important additions have been made to the Museum including samples of the latest hygienic seats and desks made under the direction of the Posture League. Many charts, lantern slides and books have been loaned to teachers and others. This Museum is open to teachers, students, and the general public at definite times. It is now under the direction of Professor W. H. Burnham.

The *Pedagogical Seminary*, a journal issued at the University, serves as a convenient medium of publication for special investigations undertaken in the department.

VII. SOCIOLOGY

The courses of the Department of Sociology are designed primarily for those who plan to engage in teaching the subject or in some phase of practical social work. Besides a general historical survey of social theories and a critique of certain major principles of sociological interpretation, chief attention is given to an analytical study of fundamental problems and methods of approaching them. Especial attention is given to quantitative methods of study as supplying the best training for social investigation and the most effective means for displacing opinion with fact in controverted matters.

The courses outlined below indicate the scope and nature of the work offered. A major for the Ph.D. degree may be taken in this department; the required minor can be taken in Psychology, History, or Pedagogy according to the interests of the student.

Dr. Hankins offers the following courses:

1. History of Social Theories. A survey of the main contributions to sociological literature beginning with Auguste Comte. A partial list of the writers covered in 1917–18 is: Comte, Quetelet, Buckle, Bagehot, Spencer, Novicow, Worms, Kidd, de Greef, Gumplowicz, Kropotkin, Oppenheimer, Small, Ratzenhofer, Ward, Giddings, Durkheim, Sumner, Boas, Ross, Cooley, and McDougall. Attention was given to the contributions of modern biology, of anthropogeography, and of the economic determinists. Each author is taken up in turn and his viewpoints and principles analyzed and discussed. *Two hours per week.*

2. General Sociology. A series of lectures dealing with social origins and evolution and sociological analysis. Topics treated include the origin of man, of races, and of society; primitive ideas; religion, its

origin, evolution and function; the family; tribal society; the state; philosophies of history. The analysis of social factors treats the physiographic, biological, economic and psychological bases of society and such special processes as natural and artificial selection; communication; coöperation; competition; differentiation; socialization. *One hour per week.*

3. Problems of Population. Considers various laws of population as developed by Malthus, Spencer, Nitti and others; vital statistics, birth and death rates, heredity and selection with some attention to statistical methods; theories of racial decay; eugenics and race-regeneration; and biological and sociological conditions affecting the supply of genius. Lectures, reports, discussions. *One hour per week.*

4. Nature versus Nurture. Questions of social policy frequently resolve themselves into opinions as to the relative importance of biological and environmental factors in the life of individual or group. This course begins with an analysis of the matter and methods of the works of Galton and Pearson and the contrasted works of Ward and others. There follows a survey of investigations in the mental measurements of groups and races, and such studies of social life—child mortality, poor relief, crime and delinquency, alcoholism, etc.—as may throw some light on the respective parts played by inheritance on the one hand and social custom and training on the other. *One hour per week.*

5. Problems of Social Reconstruction. The development of the philosophy of individualism and *laissez-faire* as related to its historical conditions is sketched, its statement by Smith, Bentham, Mill and Spencer is analyzed, and its bearings and limitations considered. A discussion of the theories of justice is followed by a treatment of various special problems, such as minimum wage, unemployment, and the distribution of wealth and income, and the basis and limitations of the movement toward collectivism. *One hour per week.*

6. Elements of Statistical Method. A course designed to familiarize the student with present methods of handling quantitative data in social science with special reference to various kinds of averages, and measures of dispersion and of correlation. *Two hours per week.*

7. Journal Club. Given to reports on theses and selected portions of the current literature. Special attention is given to the periodical literature dealing with population questions or with some phase of sociological inquiry. *One hour per week.*

During 1917–18 courses 1, 4, and 5 are given; for 1918—19 courses 2, 3, and 6 will be offered.

Dr. Calhoun offers the following courses:

1. THE SOCIAL HISTORY OF THE AMERICAN FAMILY. After a brief survey of European origins and of the colonial period the major portion of the course is given to an exposition and interpretation of the evolution of the family in the United States. Causal connections with other social institutions and with environmental conditions are traced. Special attention is given to the influence of economic evolution and to the consequent outlook for the future. *One hour per week.*

2. SOCIAL CAUSATION, a Critique of the Economic Interpretation of History. This course sets forth the present status of sociology in respect to scientific validity, stresses the importance of a correct formulation of the social forces, classifies the main human interests, analyzes and appraises various interpretations of social evolution, and in particular undertakes an exhaustive criticism of the economic interpretation. *One hour per week.*

3. SOCIAL RELATIVITY. This course illustrates by material selected from economic theory, sociologic doctrine, philosophy, religion, etc., the relativity of systems of thought and behavior. A beginning is made at an interpretation of the history of thought and of objective social institutions in terms of the general social environment. *One hour per week.*

4. OPPORTUNISM. A study of expediency as a standard for social change. The course investigates the workings and results of extremism, conservatism, compromise, and other social attitudes, and attempts in particular to evaluate opportunism as a mode of progress. *One hour per week.*

Course 3 is given during the year 1917–18; courses 2 and 4 will be offered in 1918–19.

VIII

HISTORY AND INTERNATIONAL RELATIONS

The distinctive feature of the Department is the new value it aims to emphasize in the study and teaching of history. Without neglecting scholarly investigation in the economic, political and social life of preceding centuries, it seeks to know the past primarily in order to understand the present; to learn from a study of their historical evolution how the various nations and races have developed the characteristics and culture which mark them today; to gain a sympathetic appreciation of the best in other civilizations; and to evaluate correctly the problems and the difficulties constantly arising in the international relations of the family of states. The field of history covered is not limited to the United States and three or four of the older nations of Europe, but includes as well the newer and rapidly developing states of Asia, Latin-America and Africa. Political development is regarded as of no greater importance than economic, social and religious advance.

ANNUAL HISTORICAL CONFERENCES

In carrying out these features of its work, the Department has arranged annual conferences for the discussion of the history and the present-day conditions of various lands. In 1909 the sessions dealt with the Far East, including China, India, the Philippines and Hawaii; in 1910, the Near East and Africa; in 1911, Japan and Japanese-American relations; in 1912, Recent Developments in China; in 1913, Latin America; and in 1915, the Problems

and Lessons of the World War. Altogether more than one hundred and seventy-five men have taken part in these conferences—university professors, anthropologists, leading natives, government officials, officers of the army and navy, travelers and missionaries—all of whom could speak with authority. The University students are enabled not merely to read the addresses and papers, which are issued in a series of bound volumes, but to listen to and meet these men who are both writing and making present-day history.

JOURNAL OF RACE DEVELOPMENT

The *Journal of Race Development* is another means for emphasizing present historical values. Published quarterly by the University, under the editorship of President G. Stanley Hall and Professor Blakeslee, assisted by a board of twenty-one contributing editors, the majority of them from the faculties of other Institutions, it has been a forum, during the past five years, for the discussion of the problems which relate to the progress of races and states generally considered backward in their standard of civilization. The *Journal* is of frequent service to the work of the Department, for it publishes from time to time articles and theses of advanced students, which show particular excellence.

COURSES

The various courses offered in the Department are so arranged, in cycles of two or three years, that students working for their doctorate will be enabled to secure a full program each year. Those taking History as a major are advised to elect their minor work in Sociology. In addition to the regular courses, a feature of the methods of instruction in the Department is the frequent informal conferences between instructor and student.

Professor Blakeslee offers the following courses:

1. United States History. Different periods are taken for intensive study in successive years. In 1915–16 the course dealt with the period from the formation of the Constitution to the Compromise of 1850, and included the economic and social development of the country during these years as well as the history of politics. In 1916–17, it extended from the Compromise of 1850 to the close of the Civil War, with emphasis upon the years between 1850 and 1861. It treated especially the institution of slavery as it existed in the Southern States, the origin and growth of the abolition sentiment, the doctrine of states rights and the development of the antagonism between the North and the South till its culmination in the Civil War. The present year, 1917–18, it deals with the Colonial period up to the formation of the Federal Constitution. A critical study is made of source material, as well as of the standard authors. The introductory lectures are followed by reports presented by students upon assigned topics. *Two hours.*

2. The Expansion of the United States. The history of the successive territorial acquisitions of the United States is traced, including the diplomatic negotiations and the relations with foreign powers. This is followed by a study of the constitutional questions involved, especially those regarding the status of newly acquired possessions and of present-day dependencies; the differences between incorporated and unincorporated territory; and the rights and privileges of inhabitants and citizens of the various lands considered. The aims and the continuity of the American Colonial policy are pointed out. *One hour.*

3. The History of American Diplomacy. This course will treat of the international relations of the United States from its beginning as an independent nation to the present day. It will trace the gradual development of American foreign policy, point out its distinctive features, and show how it has differed from the diplomacy of other countries. A familiarity with the standard books in the field will be expected, and frequent reference made to such source material as Moore's Digest and the Foreign Relations of the United States. *Two hours.*

4. International Law. The aim of this course is to give a knowledge of the general principles of International Law. So far as possible definite cases are studied, and for that purpose Scott's "Cases on International Law" and Stowell and Munro's "International Cases" are followed. Especial attention is paid to the legal questions involved in the existing international controversies; to the

history of arbitration; and to the modifications in International Law introduced by the war and by such international Congresses as those held at The Hague. During the past year, the problems in international law arising from the war in Europe and from the relations of the neutral to the belligerent states, were given the closest study. A number of the most important legal issues between the United States, Great Britain and Germany were argued, as in an international court. The leading authorities and the cases are supplemented by lectures and discussions. *Three hours.*

5. The Far East. The lectures deal with Russia in Asia; Japan, with its colonies, Formosa and Korea; Manchuria, including the history and present status of the struggle for its control; China and the revolution; the Philippines and Hawaii; and the international politics of the Far East and of the Pacific Ocean. *One hour.*

6. British Colonies and Dependencies. A survey of the important political, economic and social conditions in the leading British possessions, especially in Canada, Australia, New Zealand, India and Egypt; and a discussion of British colonial policy and problems. *One hour.*

7. Latin America. A survey of the history of the various countries is followed by a consideration of international diplomacy, political problems, systems of government, race questions, and economic and industrial conditions. Especial emphasis is placed upon the past and present relations, both in trade and diplomacy, between the United States and the countries of Latin America; this involves a careful study of the Monroe Doctrine. The lectures are based, in part, upon material which has been secured in a recent trip to South America. *Two hours.*

8. Historical Seminar. The students in the Department of History meet one evening a week in a seminar for the consideration of particular topics of historical interest and for the review of book and magazine material of especial value. Each member is expected to present reports which then form the basis for a general discussion.

The present year the Seminar is devoting its time to diplomatic subjects, especially those relating to the European war and those in which the United States is a party. A critical study is being made of the problems dealing with the territorial settlement of the war, including especially the claims of the various nationalities, such as the Czechs and the Jugo-Slavs, and a consideration of the economic factors and the treatment of the natives in the colonies of Africa and the Pacific.

The past year especial attention was given to a study of the development of Pan-Americanism.

During the year 1917–18, courses 1, 3 and 8 are given.

Dr. Gras offers the following courses:

1. THE ECONOMIC HISTORY OF EUROPE FROM 1300 TO THE PRESENT. The work in this course consists largely of oral reports. These are commented upon by the lecturer and made the basis of general discussion. Such topics as the following are studied: the origin of towns, the decay of the manor, the rise of a free tenant class, the revolts of 1381 and 1525, the enclosure movement; the Hanseatic League, Italian commercial supremacy, the formation of national companies, the struggle for a market, the history of prices; medieval crafts, the domestic system of industry, the industrial revolution; mercantilism, the free-trade movement, modern protectionism, national economic regulation. The object of the course is in part to familiarize the student with the literature on the subject. A reading knowledge of French and German is of great service. *Two hours.*

2. THE ECONOMIC AND POLITICAL HISTORY OF EUROPE SINCE 1789. Lectures are delivered on such topics as the French revolution, the Napoleonic régime, the proletarian upheavals, the industrial revolution, the history of trade unionism, socialism and syndicalism, the formation of the German Empire and of the Kingdom of Italy, the struggles of the papacy. *Two hours.*

3. THE HISTORY OF ENGLAND. From year to year special periods of English history are selected for intensive study (during the year 1915–16, the Tudor and Stuart periods). Although emphasis is placed upon insular developments, nevertheless the relation of English to general European history is regarded as an essential part of the work. *One hour.*

4. THE LITERATURE OF HISTORY. A study in Historical Aims and Methods. About thirty of the most significant historians are reported on by members of the class. In this number are Herodotus, Thucydides, Livy, Bede, Matthew Paris, Machiavelli, Guicciardini, Francis Bacon, Voltaire, Gibbon, Von Ranke, Mommsen, Gardiner, Froude, Carlyle and Michelet. *Two hours.*

5. THE RENAISSANCE IN EUROPE. The history of the period 1350–1600 is studied as the close of the middle ages and the beginning of modern times, the chief interest centering in the economic, political, and artistic developments of the age. Considerable reading in contemporary sources and in modern works is required. Instruction is by means of lectures. *One hour.*

6. THE MEDIEVAL AND MODERN HISTORY OF EUROPE. Students meet the instructor in private conference at stated periods to discuss the reading of monographic and encyclopedic works. Assignments are made in accordance with the needs of individuals. This course is intended primarily for candidates for the doctorate, who are prepared to use the French and German as well as the English language. *One hour.*

Courses 1 (with some modifications) and 4 are offered during the year 1917–18.

LIBRARY

The Library is under the control of a Library Committee, appointed by the Trustees, of which the President of the University is *ex officio* chairman. The duties of this committee are to advise concerning the arrangement, cataloguing, use of books, and other matters pertaining to the Library not reserved to the Trustees nor otherwise provided for.

LIBRARY COMMITTEE

PRESIDENT G. STANLEY HALL, *Chairman*
PRESIDENT EDMUND C. SANFORD
PROFESSOR WILLIAM E. STORY, *Secretary*

LIBRARY STAFF

LOUIS N. WILSON, *Librarian*

ASSISTANTS

EDITH M. BAKER, *Senior Assistant*
HELEN J. ELLIOT, *Cataloguer*

MABEL O. BOICE
ETHEL S. MCCOY

MILDRED W. PAGE
ETHEL A. PENNELL

The Library building is situated on the corner of Main and Downing streets. The Public Opening of the building was held January 14th, 1904. A full description of the building and of the Proceedings at the Opening will be found in the *Publications of the Clark University Library* for April, 1904 (Vol. 1, No. 3).

The College Library and study rooms occupy the lower floor of the new building, opened in September, 1910, and described in the College Record, July, 1910, Vol. 5, pp. 185–187.

The Library contains over 83,000 bound volumes and pamphlets, and the reading-room receives over 500 journals.

The books are grouped as follows:

A	Works of General Reference
B	Journals
C	Mathematics
CD	Math.-Physics
D	Physics
DE	Physical Chemistry
E	Chemistry
F	Biology, Zoölogy, Botany, Physiology, Neurology
G	Geography
H	Pathology
I	Psychology
J	Philosophy
K	Religious Psychology
L	Biography
M	Anthropology
N	Education
O	General Science
P	History
R	Political and Social Science Economics
S	English
T	Modern Languages
U	Classics
W	Practical Arts
X	Library Science
Y	Art
Z	European War

Tuesday and Friday mornings, each week, all books recently added to the library are placed upon a table in the Reference section where they remain for three days. This affords the members of the University and College an opportunity to examine the new books in all departments before they are placed upon the shelves for circulation.

About once a month, during term, by the courtesy of our booksellers, new books are placed for inspection on one of the tables in the Reference section. Any member of the University or College may recommend the purchase for the library of books thus displayed, and such recommendation will receive prompt attention.

All books are classified by the heads of departments and particular attention is paid to the needs of students engaged in research work. The library already possesses a good collection of complete sets of the best scientific periodicals. It makes liberal purchases for individual needs and supplements these by drawing upon the resources of the older and larger libraries through the inter-library loan system. During the past year 476 volumes were borrowed from, and 730 volumes lent to, other libraries. The number of books added each year is about four thousand volumes.

The publications of the Library, edited by the Librarian, and begun in October, 1903, are as follows:

VOL. I

(1) Bibliography of the Published Writings of President G. Stanley Hall. (2) Bibliography of Child Study for the Year 1902. (3) Proceedings and Addresses at the Public Opening of the Library Building of Clark University, January 1904. (4) Bibliography of Child Study

for the Year 1903. (5) Preparing Manuscript for the Press. (6) Founder's Day, Clark University. (7) Bibliography of Child Study for the Year 1904. (8) The Probable Source of the Plot of Shakespeare's Tempest. (9) Public Opening of the Art Department of Clark University, Dec. 5, 1905.

VOL. 2

(1) List of Books and Pictures in the Clark Memorial Collection. (2) Bibliography of Child Study for the Year 1905. (3) A Few Titles in Child Study. (4) Proceedings at the First Annual Banquet of the New England Association of Alumni of Clark University, and at the Banquet of the Washington, D. C., Alumni Association, 1907. (5) Bibliography of Child Study for the Year 1906. (6) Bibliography of Child Study for the Year 1907. (7) The Outlook for Research (Founder's Day Address, February 1, 1911). (8) List of Papers in the Field of Religious Psychology Presented at Clark University. (9) List of Degrees Granted at Clark University and Clark College.

VOL. 3

(1) The Relative Legibility of Different Faces of Printing Types (2) Suggestions for a Model Private Library at Clark College. (3) Bibliographies on Experimental Pedagogy. (4) Further Suggestions for a Model Private Library at Clark College. (5) Bibliographies on Educational Psychology. (6) Representative Books in Child Study. (7) Twenty-Fifth Anniversary of Clark University, 1889–1914.

VOL. 4

(1) List of Degrees granted at Clark University and Clark College, 1889–1914. (2) Alexander Francis Chamberlain. In Memoriam. (3) Bibliographies on Educational Subjects—No. 3. (4) The Universities and Investigation. Address delivered on Founder's Day, February 1, 1915. (5) Bibliographies on Educational Subjects—No. 4. Experimental and General Pedagogy. (6) Directory of Alumni, Faculty and Students. Clark University.

VOL. 5

(1) Bibliographies on Educational Subjects—No. 5. (2) Report of the President and Departments, 1916. (3) The Future of Science in America. (4) Posters and Pictures Relating to the European War. (5) Americanism in War and in Peace. (6) Bibliographies on Educational Subjects—No. 6. (7) Suggestions for the Preparation of the M. A. Thesis.

The books in the Art Department are accessible on application to the librarian, but, by the terms of the Founder's will, they cannot be taken from the building.

All the privileges of the Library are open to all members of the University, and each member has direct access to every book and journal.

The Library is open from 8 a.m. to 6 p.m. each week day from Sept. 1 to July 1. During July and August it is open from 8 a.m. to 5 p.m. from Mondays to Fridays, and on Saturdays from 8 a.m. to 12 m. The library is closed July 4th, Thanksgiving Day and Christmas Day.

Outside the University are found:

The Library of the American Antiquarian Society, organized in 1812, and containing over 125,000 volumes, accessible to all members of the University.

The Worcester Public Library, containing 600 newspapers and magazines and nearly 200,000 volumes, has, in the past, to some extent supplemented the scientific publications purchased by the University, and all its privileges are accessible without charge.

The Library of the Worcester District Medical Society of about 12,000 volumes, is also free to all members of the University.

LIBRARY RULES

No loud talking is allowed in any part of the Library.

Every book shall be returned at the end of one calendar month from the time at which it was taken out, but may be called in at any time at the discretion of the Librarian.

Current numbers of periodicals shall not be taken out until they have been in the Library ten days.

All dictionaries, cyclopædias, and books of general reference are permanently reserved.

Reserved books and current numbers of periodicals, exempt from circulation, may be taken out after 5 p.m., but must be returned before 9 o'clock the next morning, excepting that such books and periodicals may be taken out Saturdays at 12 o'clock, and may be kept until 9 o'clock the next Monday morning.

Readers must not write nor make any mark upon any book, manuscript, map, or other property belonging to the Library.

Any breach of the above Rules will involve suspension of the Library privileges until personally restored by the Librarian. All such cases shall be laid before the Library Committee at their next meeting.

ART DEPARTMENT

In his last will and testament the Founder of the University bequeathed

"the sum of $100,000, as an endowment fund for the Art Department of said University, and said sum is to be held and kept sacred and intact as a principal not to be used or expended under any conditions; but the income, interest or proceeds thereof shall be used only in putting and keeping said works of art or others given or obtained for said department in good condition and in taking care of them; and then if there is a surplus of the income of said fund left, I will and direct that it be used in the purchase of additional works of art or of such matters as will add to the usefulness and efficiency of said Art Department."

Under these conditions a large room has been furnished and equipped on the upper floor of the Library Building. Upon the death of Mrs. Clark, those of the Founder's collections that were deemed most suitable for this purpose were arranged and displayed in this room, together with his most valuable books, which, by the conditions of the will, cannot be removed from the building. A complete catalogue of these books and paintings has been published in the PUBLICATIONS OF THE LIBRARY, Vol. 2, No. 1.

A Curator and Custodian have been appointed by the Board (see page 107) and all the collections are now accessible to visitors. The Art Department is open daily (except Sundays) from 9 a.m. to 5 p.m.

Three portraits and one landscape painting have been added to the collection:

1909. Portrait of the late Carroll D. Wright, President of the Collegiate Department from 1902 to 1909, by the late Frederick P. Vinton of Boston. This painting was awarded the Temple Gold Medal at the 1909 Exhibition of the Pennsylvania Academy of Fine Arts.

1911. Portrait of G. Stanley Hall, President of Clark University, by the late Frederick P. Vinton of Boston.

1913. Landscape painting "Snowing," by Joseph H. Greenwood of Worcester.

1914. Portrait of Edmund C. Sanford, President of Clark College since 1909.

To commemorate the twenty-fifth anniversary of the University the Board of Trustees, early in 1914, commissioned Mr. Victor D. Brenner of New York to prepare a medal to mark that event. The medal is made of bronze and is three inches in diameter. On the obverse is delineated the head of President Hall, and on the reverse a beautiful allegorical group symbolizing the spirit of the University, and the legend,

> "Knowledge is proud that he has learned so much,
> Wisdom is humble that he knows no more."

Scale models of the buildings and the University grounds have been made by T. J. McAuliffe and Son of Worcester, under the direction of the architects, Messrs. Frost and Chamberlain.

During the past year more pictures, cartoons and posters relating to the European War have been purchased. The collection now numbers nearly 4000 items.

REGULATIONS

1. All requisitions for apparatus must be made through the Bursar's office upon printed blanks provided for that purpose and signed by a member of the staff.

2. So far as possible, orders for only the kind and amount of apparatus certain to be used during the year shall be placed; nothing shall be ordered for future years, and apparatus for research shall take precedence over that for teaching and illustration only.

3. Requisitions for repairs, furniture, plumbing and work about the buildings must be made through the Bursar's office in writing and with detail, and, when once passed upon, no change involving additional expense can be made in the requisition without the consent of the Finance Committee.

4. No unappropriated rooms and no part of the University grounds shall be used for any purpose, and appropriated rooms shall not be used for other purposes than the stated University work for which they were intended, without previous permission from the office.

5. Unless for special reasons, absence of instructors from their stated exercises or from town for two consecutive week days in term time should be announced at the office, and for longer absence permission should be obtained beforehand.

6. The Trustees desire that no Instructor, Docent, or

Fellow shall enter upon other engagements outside his proper work in the University of a kind or amount likely to lessen his full efficiency for science within the University.

7. Appropriations shall hereafter cover all apparatus and supplies of whatever nature for laboratories, for demonstration or illustration; all metal and carpenter work connected with the scientific activity of each department; and every form of special service. Appropriations, however, shall not hereafter cover orders for books or journals, which shall be submitted to the Library Committee.

8. The several appropriations made to individual instructors and others shall be the full and fixed limit of the liability of the University, to be on no account transcended; and for every excess over the appropriations, from whatever cause, the instructor making the order shall be personally responsible.

9. No order for any purpose shall be paid by the University, whether on appropriations or for general supplies, that has not passed through the Bursar's office.

10. The President, Professors, Assistant Professors and regular Instructors authorized by the Board to do graduate work, together with the Librarian, shall constitute the Faculty of the University. Its meetings shall be called and presided over by its President, or, in his absence, by a Professor whom he shall designate. The Faculty shall elect a Secretary and its records shall always be accessible to the Trustees. Its jurisdiction shall include all matters pertaining to the instruction, conduct and discipline of students, and such other duties as may be prescribed by the Trustees.

11. The President of the University shall make, at the October meeting of the Board, an annual report on the condition of the departments and their work during the year and shall have authority to require and receive from all Instructors and Officers of the University and Library such reports as he may deem necessary. A copy of these reports, including that of the Library, shall be deposited with the Mayor of the City.

12. The University Faculty shall have the oversight of all graduate work and shall recommend for the Master's, Doctor's and all other graduate degrees upon such terms, conditions, and forms as it may determine, and exercise such other functions and responsibilities as are not expressly assigned to the Trustees or to the Collegiate Department.

13. The Custodian of the Art Collection shall have general oversight over its room in the Library Building and its contents, together with their care and use, under the direction and control of the Curator. The Curator shall from time to time submit to the Trustees his recommendations for the purchase of additional works of art from the income of the Art Fund, based on and together with the opinions of experts as to their value and desirability. All such purchases shall be approved by the Board of Trustees, or by such a committee of their members as they shall appoint for that purpose.

14. The President of the University shall make an annual report to the Trustees of the action of the Library Committee, of which he is Chairman, and this report, if approved, shall be filed and preserved.

DEGREES CONFERRED

On June 19, 1917, the University conferred degrees on the following persons:

MASTER OF ARTS

MILDRED ALLEN
Thesis: Applications of variable currents to ballistics and magnetism
ROYAL TYLER BALCH
Thesis: Copper deposits from copper sulphate gelatine solutions
CHARLES BIRD
Thesis: A psychology of the soldier
JOHN EDWARD BRIERLY
Thesis: The history of transportation in New England
ELIZABETH BROOKS
Thesis: The junior college
GENEVIEVE A. J. CHARBONNEAU
Thesis: The presumed handicapping of the first-born
CHUNG YEN CHIU
Thesis: Methods of measuring resistances of electrolytic solutions
ELMER BAGNALL CLARK
Thesis: Factors in vocational determinations
ROSWELL FREDERICK CURTIS
Thesis: The effect of ammonia upon the viscosity of certain aqueous salt solutions
JAMES MCBRIDE DABBS
Thesis: A comparative study of the development of the God-idea among the Hebrews and the Chinese
THOMAS EDWARD DAY
Thesis: A study of scarlet fever
FRANK HAROLD ELLSWORTH
Thesis: Electrolytic conductance of mercuric chloride
WALTER HENRY EVANS
Thesis: The psychological aspects of Sundayism

Henry Douglas Fryer

Thesis: An introduction to the psychology of alcoholism

Lewis Van Hagen Judson

Thesis: A study of the absorption of gases in electrical discharge tubes

Leib Lehrer

Thesis: Race prejudice in the light of some fundamental psycho-analytic principles

Kelly Miller, Jr.

Thesis: Quantitative experiments on the telephone

Lily Elma Mitchell

Thesis: Social and economic factors of certain aberrant religious bodies in Worcester

Gren Oren Pierrel

Thesis: Quakers in Massachusetts

Samuel Ernest Pond

Thesis: Correlation of the velocity of the contraction-wave of muscle with the electrical conductivity of media

Francis William Power

Thesis: A study of the reactions of tellurium and sodium in liquid ammonia solution

David Sage

Thesis: A statistical study of New England genealogies

Henry Clement Walsh

Thesis: A study of teachers' salaries

Angelina L. Weeks

Thesis: A study of the influence of varied instructions on results obtained in class exercises

Austin Lawrence Whittey

Thesis: Nationalism: Its history and relation to the great war

Ernest Richard Wood

Thesis: Arithmetical habits

Yosohachi Yokogawa

Thesis: The education of Japanese women

Michael Jacob Zigler

Thesis: Developmental changes at the six-year period

DOCTOR OF PHILOSOPHY

Raymond Flavius Bellamy

Dissertation: Patriotism in its modern and genetic aspects

Theodore Benda

Dissertation: Mental factors in the causation, cure, and prevention of disease

Hagop Boghoss Boghossian

Dissertation: The individual and society

Ethel Bowman

Dissertation: An introspective analysis of the process of believing

Edward Henry Darby

Dissertation: The ionization of sodium in soda glass

Wilbur Brooks Dexter

Dissertation: The conductance of dilute aqueous solutions

Aubrey Augustus Douglass

Dissertation: The junior high school

Edwin Elmore Jacobs

Dissertation: Changes in the physical vigor of American women during the past half-century

Melvin M. Knight

Dissertation: The gynaecocentric theory in the light of modern biology

Martin Luther Reymert

Dissertation: Objective study of teachers

Ancel St. John

Dissertation: Crystal structure of ice

William Franklin Slade

Dissertation: The federation of Central-America

Robert Brown Teachout

Dissertation: An analysis of the processes involved in apprehending the meaning of words and sentences

Louis Thompson

Dissertation: High vacuum spectra from intact by cathode rays

Curtis T. Williams

Dissertation: Some aspects of individual psychology

Samuel Zeldin

Dissertation: On the structure of finite continuous groups with a single exceptional infinitesimal transformation

PUBLICATIONS

A Register and Official Announcement is issued each year in January or February.

In the years 1890, 1891, 1893, 1902 and 1916, the annual Report of the President to the Board of Trustees was printed.

A Summer School was held for nine years ending in 1903, and in such years a Summer School Programme was issued.

In July, 1899, the University observed its tenth anniversary, and published the following volume:

Clark University, 1889-1899. Decennial Celebration. 8 x 11 in., pp. 566. Published for the University. Price, $5.00. Contains the lectures delivered by Professors Picard, Boltzmann, Ramon y Cajal, Mosso and Forel at the Decennial Celebration, July, 1899; also reports by the heads of departments on their aims and ideals, with a list of past and present members of the University and the titles of their published papers.

PROCEEDINGS OF THE CHILD CONFERENCE FOR RESEARCH AND WELFARE. Conferences held at Clark University in the summers of 1909 and 1910. Vol. 1, 1909, 257 p., contains 48 papers on problems relating to child welfare. Vol. 2, 1910, 287 p., contains 34 papers, on similar subjects. The papers in Vol. 1 were reprinted from the Pedagogical Seminary for September and December 1909, but those in Vol.

2, with one exception, have not been printed elsewhere. Price $2.00 per volume in paper, $2.50 in cloth. Louis N. Wilson, Publisher, Worcester, Mass.

In connection with the celebration of the 20th anniversary of Clark University in September, 1909, conferences and lectures were held by the several departments to which distinguished scientists and educators in this and other countries contributed. Two volumes of these lectures have been published with the titles:

Lectures and Addresses Delivered before the Departments of Psychology and Pedagogy in Celebration of the 20th Anniversary of the Opening of Clark University. 175+80 pages. Price, $2.00.

Lectures Delivered at the Celebration of the Twentieth Anniversary of the Foundation of Clark University under the Auspices of the Department of Physics. 161 pages. Price, $2.00.

Japan and Japanese-American Relations, pp. xi, 348, New York: G. E. Stechert and Company, 1912, $2.50. Edited by Professor George H. Blakeslee. The volume contains twenty-two of the addresses delivered by the experts, both Japanese and American, who met at the Clark University Historical Conference, November, 1911. Each of the chapters deals with a distinct topic; together they cover progressively the field of what is both most interesting and most vital in the present national and international situation of Japan.

Recent Developments in China, pp. xi, 413, New York: G. E. Stechert and Company, 1913, $2.50. Edited by Professor George H. Blakeslee. These twenty-two addresses, given at the Clark University Conference, November, 1912, by Chinese and Americans who have a recent, intimate and authoritative knowledge of China, present the underlying causes of the Revolution, and the progress and

problems of the Chinese people in government, education, social welfare, industry and religion.

LATIN AMERICA, pp. xii, 388, New York: G. E. Stechert and Company, 1914, $2.50. Edited by Prof. George H. Blakeslee. Twenty-nine addresses given at the Clark University Conference, November, 1913.

These addresses, by well-known authorities upon Latin-American affairs, including a large proportion of citizens of Latin-American countries, present a critical study of the salient features of the life of the American Republics to the south of us, and of their relations to the United States. Among the topics especially emphasized are, the Monroe Doctrine, the Mexican Situation, Trade and Business Relations, Diplomatic Relations, and Education.

PROBLEMS AND LESSONS OF THE WAR. Clark University Addresses. Edited by Professor George H. Blakeslee. Foreword by President G. Stanley Hall. New York and London, G. P. Putnam's Sons, 1916, 424 pps. $2.00.

This volume contains side by side the opposing views on the fundamental issues of the war as presented by twenty-four writers of wide reputation. Three British subjects, one a member of Parliament, and three American citizens of German descent and sympathy—all university professors—are among the contributors. Some of the subjects discussed are: The Effect of the War Upon Europe, The German Theory of State, The German Theory of Militarism, What a German Victory Would Mean, The Effect of the War Upon Pan-American Coöperation, The Economic Position of the United States at the Close of the War, Naval Lessons to the United States in the War, The Maintenance of Our National Obligations, The Extension of the Monroe Doctrine, Economic Aspects of the War, Nationalism and War, The Red Cross Work, and Preparedness. President G. Stanley Hall discusses, in his foreword, The Psychology of the Present War.

JOURNALS CONNECTED UNOFFICIALLY WITH THE DEPARTMENTS

THE AMERICAN JOURNAL OF PSYCHOLOGY. This journal was commenced in November, 1887, and is now edited by G. Stanley Hall, E. C. Sanford, E. B. Titchener (Cornell University), and J. W. Baird, with the assistance of an international board of coöperators. Each volume contains four numbers—issued in January, April, July and October. Besides original articles, a considerable portion of its space is devoted to careful digests of the important literature in its field. Price, $5.00 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

THE PEDAGOGICAL SEMINARY. This journal was begun in January, 1891, and is edited by the President of the University with the assistance of William H. Burnham, Professor of Pedagogy. It is an international record of educational literature, institutions and progress, and is devoted solely to the highest interest of education in all grades, with digests of important literature of all countries. It is the organ of the Educational Department of the University. Each volume contains four numbers—issued in March, June, September and December. Price, $5.00 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

THE JOURNAL OF RACE DEVELOPMENT. This journal was begun in July, 1910, and is edited by Dr. Blakeslee and President Hall with the coöperation of a board of twenty-one contributing editors. It offers itself as a forum for the discussion of the problems which relate to the progress of races and states generally considered backward in their standard of civilization. Issued quarterly, each number containing about 125 pages. Price, $3.00 per volume; 75 cts. per number. Louis N. Wilson, Publisher, Worcester, Mass.

JOURNAL OF APPLIED PSYCHOLOGY. This journal will appear quarterly, beginning March, 1917. It is edited by President G. Stanley Hall and Drs. J. W. Baird and L. R. Geissler, with the coöperation of twenty contributing editors. It aims to be a medium for original investigations on the practical problems of psychology, and to digest the literature in its field through book reviews and summaries of articles appearing in other periodicals. Each volume of four issues will contain about 400 pages. Price, $4.00 per volume; single copies, $1.25. Florence Chandler, Publisher, Worcester, Mass.

UNIVERSITY COLORS

EMERALD GREEN AND WHITE

To be worn in the hood as a green chevron
on a white field

The Waverly Press
WILLIAMS & WILKINS COMPANY
BALTIMORE, U. S. A.

Clark University
in the City of Worcester
Massachusetts

Register and Thirty-first Official Announcement

1919

CLARK UNIVERSITY

WORCESTER, MASSACHUSETTS

REGISTER AND THIRTY-FIRST OFFICIAL ANNOUNCEMENT

WORCESTER, MASSACHUSETTS
Published for the University
March, 1919

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* Died June 20, 1918

John Wallace Baird

Assistant Professor of Experimental Psychology
February 1910 - February 1913

Professor of Experimental Psychology
February 1913 - February 1919

Born at Motherwell, Ontario, Canada, May 21, 1869
Died at Baltimore, Maryland, February 2, 1919

CALENDAR 1919–1920

1919			
FEB.	1	Saturday	Founder's Day*
FEB.	22	Saturday	Washington's Birthday
APRIL	7	Monday	Spring Recess
APRIL	12	Saturday	
APRIL	19	Saturday	Patriots' Day
MAY	30	Friday	Memorial Day
JUNE	23	Monday	Thirtieth academic year closes

Summer Vacation

SEPT.	25	Thursday	Thirty-first academic year begins
OCT.	13	Monday	Columbus Day
NOV.	27	Thursday	Thanksgiving Day
DEC.	24	Wednesday	Christmas Recess
1920			
JAN.	3	Saturday	
FEB.	2	Monday	Founder's Day*
FEB.	23	Monday	Washington's Birthday
APRIL	5	Monday	Spring Recess
APRIL	10	Saturday	
APRIL	19	Monday	Patriots' Day
MAY	31	Monday	Memorial Day
JUNE	21	Monday	Thirty-first academic year closes

*Not a holiday

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WILLIAM HENRY BURNHAM
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CHARLES A. KRAUS
FRANK HAMILTON HANKINS

OTHER MEMBERS OF THE FACULTY

JOSEPH DE PEROTT
LOUIS N. WILSON
FRANK BLAIR WILLIAMS

UNIVERSITY STAFF

Granville Stanley Hall, Ph.D., LL.D. 156 Woodland St
President of the University and Professor of Psychology

A.B., Williams College, 1867; A.M., 1870; Ph.D., Harvard University, 1878; Lecturer in Harvard and Williams Colleges, 1880–81; Professor of Psychology, Johns Hopkins University, 1881–88; President and Professor of Psychology, Clark University, 1888–; LL.D., University of Michigan, 1888, Williams College, 1889, and Johns Hopkins University, 1902; Chairman of the Library Committee and Curator of the Art Collection, Clark University. Member of the National Academy of Sciences; Resident Member of the Massachusetts Historical Society; Member of the Committee on Psychology, National Research Council.

William Edward Story, Ph.D. 17 Hammond St.
Professor of Mathematics and Secretary of the Faculty

A.B., Harvard University, 1871; Ph.D., University of Leipzig, 1875; Parker Fellow (Harvard), 1874–75; Tutor of Mathematics, Harvard University, 1875–76; Associate, Assistant Professor, and Associate Professor of Mathematics, Johns Hopkins University, 1876–89; Professor of Mathematics, Clark University, 1889–; Professor of Mathematics, Clark College, 1902–07. Member of the National Academy of Sciences; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

Edmund Clark Sanford, Ph.D., Sc.D., LL.D.
Lecturer on College Administration 160 Woodland St.

A.B., University of California, 1883; Fellow, Johns Hopkins University, 1887; Ph.D. Johns Hopkins University, 1888; Instructor in Psychology, Johns Hopkins University, 1888; Instructor in Psychology, Clark University, 1889-92; Assistant Professor, 1892–1900; Professor of Psychology, Clark College, 1903–07; Professor of Experimental and Comparative Psychology, Clark University, 1900–09; Lecturer on College Administration, 1909–; Sc.D., Hobart College, 1909; President of Clark College, 1909–; LL.D., University of California, 1912.

Arthur Gordon Webster, Ph.D., Sc.D., LL.D.
Professor of Physics 66 West St.

A.B., Harvard University, 1885; Instructor in Mathematics, Harvard University, 1885-86; Parker Fellow, 1886–89; Student, Universities of Berlin, Paris, Stockholm, 1886–90; Ph.D., University of Berlin, 1890; Docent in Physics, Clark University, 1890–

92; Assistant Professor, 1892–1900; Professor, 1900–; Professor of Physics, Clark College, 1902–07; Director of Physical Laboratories; Sc.D., Tufts College, 1905; LL.D., Hobart College, 1908. Member of the National Academy of Sciences, Resident Fellow of the American Academy of Arts and Sciences; Member of the American Philosophical Society; Member of the Naval Consulting Board of the United States.

HENRY TABER, PH.D.
Professor of Mathematics 26 Dayton St.

Ph.B., Yale University, 1882; Ph.D., Johns Hopkins University, 1888; Assistant in Mathematics, Johns Hopkins University, 1888–89; Docent in Mathematics, Clark University, 1889–92; Assistant Professor, 1892–1903; Professor, 1903–; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

WILLIAM HENRY BURNHAM, PH.D.
Professor of Pedagogy and School Hygiene 767 Main St.

A.B., Harvard University, 1882; Instructor in Wittenberg College, 1882–83; Instructor, State Normal School, Potsdam, N. Y., 1883–85; Fellow, Johns Hopkins University, 1885–86; Ph.D., 1888; Instructor in Psychology, 1888–89; Docent in Pedagogy, Clark University, 1890–92; Instructor, 1892–1900; Assistant Professor, 1900–06; Professor, 1906–.

GEORGE HUBBARD BLAKESLEE, PH.D. 21 Downing St.
Professor of History and International Relations

A.B., Wesleyan University, 1893; A.M., Harvard University, 1899; Ph.D., 1903; Student, Johns Hopkins University, 1893–94; Parker Fellow, Harvard, 1901–02; Student, Universities of Berlin, Leipzig, and Oxford, 1901–03; Instructor in History, Clark College, 1903–04; Assistant Professor, 1904–09; Professor, 1909–; Instructor in History, Clark University, 1905–11; Professor, 1911–. Member of the Council of the American Antiquarian Society; Resident Member of the Massachusetts Historical Society; Member of the Commission of Inquiry to prepare data for the United States delegation to the Peace Conference, 1918–19.

*JOHN WALLACE BAIRD, PH.D.
Professor of Experimental Psychology 7 Lucian St.

A.B., University of Toronto, 1897; Student, University of Leipzig, 1898–99; Fellow, University of Wisconsin, 1899–1901; Fellow, Cornell University, 1901–02; Ph.D., 1902; Assistant in Psychology, 1902–03; Carnegie Research Assistant, 1903–04; Instructor in Psychology, Johns Hopkins University, 1904–06; Instructor in Psychology, University of Illinois, 1906–07; Assistant Professor, 1907–February, 1910; Assistant Professor of Experimental Psychology, Clark University, February, 1910–February, 1913; Professor, February, 1913–.

RALPH STAYNER LILLIE, PH.D.
Professor of Biology 21 Dayton St.

A.B., University of Toronto, 1896; Student, University of Michigan, 1896–97; Fellow, University of Chicago, 1898–1901; Ph.D., 1901; Assistant in Physiology, Harvard

* Died February 2, 1919

University, 1901–02; Instructor, University of Nebraska, 1902–03; Adjunct Professor, 1903–04; Carnegie Research Assistant at Zoölogical Station, Naples, 1904–05; Instructor in Physiology, Harvard University, 1905–06; Johnston Scholar, Johns Hopkins University, 1906–07; Instructor in Physiological Zoölogy, University of Pennsylvania, 1907–12; Assistant Professor of Experimental Zoölogy, 1912–13; Instructor in General and Comparative Physiology, Marine Biological Laboratory, Woods Hole, Mass., 1902–; Professor of Biology, Clark University, October 1913–.

Charles A. Kraus, Ph.D.

Professor of Chemistry — 11 Downing St.

B.S., University of Kansas, 1898; Fellow in Physics, Johns Hopkins University, 1899–1900; Research Fellow, Kansas University, 1900–01; Instructor in Physics, University of California, 1901–04; Research Assistant, Massachusetts Institute of Technology, 1904–08; Ph.D., 1908; Research Associate, 1908–12; Assistant Professor of Physical Chemical Research, 1912–14; Professor of Chemistry and Director of the Chemical Laboratories, Clark University, 1914–; Consulting Chemist in the Chemical Warfare Service, 1917–.

Frank Hamilton Hankins, Ph.D.

Professor of Sociology — 4 Cabot St.

A.B., Baker University, 1901; Student, Columbia University, 1903–04; Scholar in Sociology, 1904–05; Fellow in Statistics, 1905–06; Student, 1907–08; Ph.D., Columbia University, 1908; Instructor in Economics, Clark College, 1906–07; Assistant Professor, 1908–13; Professor of Political and Social Science, 1913–; Instructor in Economics and Sociology, Clark University, 1906–07; 1908–15; Assistant Professor of Sociology, 1915–17; Professsor, 1917–.

Joseph de Perott

Lecturer in Mathematics — 5 Hawthorn St.

Student, Universities of Paris and Berlin, 1877–80; Docent in Mathematics, Clark University, 1890–1904; Lecturer, 1904–.

Louis N. Wilson, Litt.D. — 11 Shirley St.

Librarian of the University and Custodian of the Art Collection

Litt.D., Tufts College, 1905.

Frank Blair Williams, Ph.D.

Instructor in Mathematics — 2 Isabella St.

C.E., University of Missouri, 1890; M. S., 1893; Engineering Work with the Mississippi River Commission, 1890–92; Teaching Fellow in Mathematics, University of Missouri, 1892–93; Survey Work with the Mississippi River Commission, 1894–95; United States Assistant Engineer in Tennessee River Improvement, 1895–97; Scholar in Mathematics, Clark University, 1897–98; Fellow, 1898–1900; Ph.D., 1900; Assistant Professor of Civil Engineering, Union College, 1900–05; Assistant Professor of Engineering and Mathematics, 1905–06; Professor of Engineering Mathematics, 1906–07; Assistant Professor of Mathematics, Clark College, 1907–08; Professor, 1908–; Honorary Fellow in Mathematics, Clark University, 1909–10;

Instructor, 1910–; Fellow of the American Association for the Advancement of Science; Member of the American Mathematical Society and of the Mathematical Association of America; Y. M. C. A. Secretary in France, 1917–18.

HARRY ELMER BARNES, PH.D.
Assistant Professor of History 32 Circuit Ave.

A.B., Syracuse University, 1913; A.M., 1914; Ph.D., Columbia University, 1918; Instructor in Historical Sociology, Syracuse University, 1913–15; Director of the University Settlement, 1914–15; University Fellow in Historical Sociology, Columbia University, 1915–16; William Bayard Cutting Travelling Fellow in the History of Thought and Culture, Columbia University, 1916–17; Historian to the *New Jersey Prison Inquiry Commission*, 1917; Lecturer in Modern European History, Columbia University, 1917–18; Associate Professor of History, Clark College, 1918–. Special Investigator for the Quartermaster General's Corps, Washington, aud Investigator for the Penal Commission of Pennsylvania, 1918.

SAMUEL WEILLER FERNBERGER, PH.D. (Absent on leave)
Assistant Professor of Experimental Psychology

B.S., University of Pennsylvania, 1908; M.A., 1909; Ph.D., 1912; Assistant in Psychology, University of Pennsylvania, 1908–09; Instructor, 1910–12; Instructor in Experimental Psychology, Clark University, 1912–15; Assistant Professor, 1915–. First Lieutenant, U. S. Infantry, 1917–.

EDWARD COWLES, M.D., LL.D., Plymouth
Non-Resident Lecturer in Psychiatry

A.B., Dartmouth College, 1859; A.M., 1863; Medical House Pupil, Retreat for the Insane, Hartford, Conn., 1860–62; M.D., Dartmouth Medical School, 1863; M.D., College of Physicians and Surgeons, New York, 1863; Medical Corps, United States Army, 1863–72; Resident Physician and Superintendent, Boston City Hospital, 1872–79; Medical Superintendent, McLean Hospital, Waverley, Mass., 1879–1903; Lecturer on Mental Diseases, Dartmouth Medical School, 1885–86; Professor of Mental Diseases, 1886–; Fellow by Courtesy, Johns Hopkins University, 1887-88; Clinical Instructor in Mental Diseases, Harvard Medical School, 1888–; LL.D., Dartmouth College, 1890; Non-Resident Lecturer in Psychiatry, Clark University, 1903–.

ARCHER BUTLER HULBERT, A.M.
Lecturer in American History 188 Highland St.

A.B., Marietta College, 1895; A.M., 1904; Professor of American History, Marietta College, 1904–18; Graduate Student, Columbia University, 1910–1911; Harvard University, 1912–13; Archivist, Harvard Commission on Western History, 1912–17; Lecturer in American History, Clark College, 1918–; Lecturer in American History at Y. M. C. A. Training Schools for Secretaries, 1917–18.

KARL JOHAN KARLSON, PH.D.
Lecturer in Philosophy 6 Wyman St.

A.B., Clark College, 1909; Scholar in Psychology, Clark University, 1909–10; A.M 1910; Fellow, 1910–12; Ph.D., 1912; Honorary Fellow in Psychology, Clark University, 1912–14; Lecturer in Philosophy, 1914–.

CHARLES WHITNEY MIXTER, PH.D.
Lecturer in Economics 2 Harvard Place

A.B., Johns Hopkins University, 1892; A.M., Harvard University, 1893; Ph D. 1897; Student, Universities of Göttingen and Berlin, 1894–95; Assistant in Economics, Harvard University, 1897–99; Instructor in Economics, Trinity College 1899–1900; Instructor in Economics, Harvard University, 1901–03; Professor of Political Economy, University of Vermont, 1903–12; Engaged in Industrial Management, 1912–18; Lecturer in Business Administration, Sheffield Scientific School, 1915–16; Assistant Professor of Economics, Clark College, 1918–.

JAMES PERTICE PORTER, PH.D., SC.D.
Lecturer in Psychology (Absent on leave)

A.B., Indiana University, 1898; A.M., 1901; Instructor in Psychology, 1900–03; In charge of work in Neurology, Indiana University Biological Station, 1901 and 1903; Honorary Fellow in Psychology, Clark University, 1903–09; Ph.D., 1906; Instructor in Psychology, Clark College, 1903–07; Assistant Professor, 1907–12; Dean of the Faculty, 1909–; Lecturer in Psychology, Clark University, February–June, 1910; Instructor, 1910–12; Lecturer, 1915–; Professor of Psychology, Clark College, 1912–; Sc.D., Waynesburg College, 1917; Captain in the Sanitary Corps, U. S. Army, 1918–.

BENJAMIN SHORES MERIGOLD, PH.D.
Instructor in Chemistry 34 Chatham St.

A. B., Harvard University, 1896; A.M., 1897; Ph.D., 1901; Assistant in Chemistry, Harvard University, 1896–1900; Instructor in Chemistry, Worcester Polytechnic Institute, 1900–03; Assistant Professor of Chemistry, Clark College, 1903–08; Professor, 1908–; Instructor in Chemistry, Clark University, 1905–12, 1915–.

GEORGE FREDERIC WHITE, PH.D.
Instructor in Biological Chemistry 38 Somerset St.

S.B., Massachusetts Institute of Technology, 1906; Ph.D.. Johns Hopkins University, 1910; Assistant in Analytical and Organic Chemistry, Massachusetts Institute of Technology, 1906–08; Fellow, Johns Hopkins University, 1909–10; Associate Professor of Chemistry, Richmond College, 1910–12; Instructor in Organic Chemistry, Clark College, 1912–13; Assistant Professor, 1913–February 1918; Associate Professor, February 1918–; Docent in Biological Chemistry, Clark University, 1913–January 1915; Instructor, January 1915–. Investigator U. S. Public Health Service, 1916–

LUDWIG REINHOLD GEISSLER, PH.D. 114 Woodland St.
Demonstrator in Experimental and Applied Psychology

B.Lit., University of Texas, 1905; Assistant in Psychology, Cornell University, 1905–09; Ph.D., 1909; Instructor in Psychology, 1909–11; Associate Professor of Psychology and Education, University of Georgia, 1912–16; Assistant Professor of Psychology and Education, Clark College, 1916–.

JAMES EDMUND IVES, PH.D. (Absent on leave)
Research Associate and Lecturer in Physics

Instructor in Physics, Drexel Institute, 1893–97; Student in Physics, Cavendish Laboratory, Cambridge, England, 1896; Scholar in Physics, Clark University, 1897–98; Fellow, 1898–1901; Ph.D., 1901; Instructor in Physics, University of Cincinnati, 1901–03; Assistant Professor, 1905–10; Associate Professor, 1910–12; Honorary Fellow in Physics, Clark University, 1912–16; Research Associate, 1916–17; Research Associate and Lecturer, 1918–; Resident Fellow of the American Academy of Arts and Sciences; First Lieutenant, U. S. Signal Corps, 1918–.

HONORARY FELLOWS AND ASSISTANTS

IRVING ANGELL FIELD, PH.D.
Honorary Fellow in Biology 1 Autumn St.

B.S., Denison University, 1903; Instructor in Ornithology, 1902–03; Assistant in Zoölogy, Harvard University, 1903–05; Austin Teaching Fellow, 1905–06; Professor of Chemistry and Biology, Western Maryland College, 1906–11; A.M., Harvard University, 1912; Instructor in Biology, Clark College, 1911–13; Honorary Fellow in Biology, Clark University, 1911–; Ph.D., 1913; Assistant Professor of Biology, Clark College, 1913–16; Associate Professor, 1916–18; Professor, 1918–.

JOHN SHAW FRENCH, PH.D.
Honorary Fellow in Mathematics 209 Lovell St.

A.B., Bowdoin College, 1895; Scholar in Mathematics, Clark University, 1895–96, Fellow in Mathematics, 1896–98; Ph.D., 1898; Assistant Professor of Mathematics; Clark College, 1918–.

ROBERT HUTCHINGS GODDARD, PH.D.
Honorary Fellow in Physics 5 Bishop Ave.

B.S., Worcester Polytechnic Institute, 1908; A.M., Clark University, 1910; Ph.D., 1911; Instructor in Physics, Worcester Polytechnic Institute, and Student in Physics, Clark University, 1908–09; Fellow in Physics, 1909–11; Honorary Fellow, 1911–12, 1914–15; Research Instructor in Physics, Princeton University, 1912–13; Instructor in Physics, Clark College, 1914–15; Assistant Professor of Physics, 1915–; Instructor in Physics, Clark University, 1916–18.

HARVEY CARSON GRUMBINE, PH.D., Lebanon, Pennsylvania
Honorary Fellow in Psychology 26 Woodland St.

Ph.B., Wesleyan University, 1892; Ph.D., University of Munich, 1900; Instructor in English, Pennsylvania State College, 1900–01; Assistant Professor of English, Washington University, 1901–02; Professor of English Literature, College of Wooster, 1902–16; Honorary Fellow in Psychology, Clark University, 1916–.

Elmer Adna Harrington, Ph.D.
Honorary Fellow in Physics 46 May St.

A.B., Clark College, 1905; Scholar in Physics, Clark University, 1905-06; A.M. 1906; Fellow, 1906-07; 1908-09; Student in Physics, University of Berlin, 1907-08; Instructor in Physics, Williams College, 1909-12; Smith College, 1912-14; Fellow in, Physics, Clark University, 1914-15; Ph.D., 1915; Professor of Physics, University of North Carolina, 1915-16; Instructor in Physics, University of Michigan, 1916-17; Lieutenant, U. S. N. R. F., 1917-19.

James King, Ph.D., Southbridge
Honorary Fellow in Psychology

A.B., Oskaloosa College, 1912; S.T.B., Boston University, 1915; Scholar in Psychology, Clark University, 1915-16; A.-M, 1916; Student, 1916-18; Ph.D., 1918.

Tetsutaro Miyazaki, Fukuoka, Japan
Honorary Fellow in Physics 12 Oberlin St.

Graduate, The Third National College, Japan. 1910; Kogakushi, Tokyo Imperial University, 1913; Lecturer, Kyushu Imperial University, 1913-16; Assistant Professor of Electrical Engineering, 1916-.

Samuel James Plimpton, Ph.D., Hartford, Connecticut
Honorary Fellow in Physics 79 West St.

Ph.B., Sheffield Scientific School, 1905; Ph.D., Yale University, 1912; Instructor in Physics, Yale College, 1912-13; Johns Hopkins University, 1913-14; Worcester Polytechnic Institute, 1914-; Scholar in Physics, Clark University, 1914-15; Honorary Fellow, 1917-.

Kajuro Tamaki, Kyoto, Japan
Honorary Fellow in Physics 31 Hollywood St.

Graduate, The Third National College, Japan, 1906; Rigakushi, Kyoto Imperial University, 1909; Lecturer in Physics, 1910-13; Assistant Professor of Mathematical Physics, 1913-; Honorary Fellow in Physics, Clark University, January 1919-.

Amy Eliza Tanner, Ph.D.
Research Assistant to President Hall 9 Hawthorn St.

A.B., University of Michigan, 1893; Scholar, University of Chicago, 1894-95; Fellow, 1895-98; Ph.D., University of Chicago, 1898; Associate in Philosophy, 1898-1902; Professor of Philosophy, Wilson College, 1903-07; Honorary Fellow in Psychology, Clark University, 1907-09; Lecturer in the Children's Institute, 1909-18; Research Assistant to President Hall, 1911-.

Louis Ten Eyck Thompson, Ph.D.
Honorary Fellow in Physics 48 Downing St.

B.S., Kalamazoo College, 1914; Scholar in Physics, Clark University, 1914-15; A.M., 1915; Fellow, 1915-17; Ph.D., 1917; Research Assistant to Dr. Webster, 1916-18; Instructor in Mathematics and Physics, Clark College, 1917-18; Assistant Professor of Physics, 1918-.

Charles Edward Wilder, Ph.D.
Honorary Fellow in Physics 766 Main St.

A.B., Harvard University, 1912; A.M., 1913; Instructor in Mathematics, 1914–15; Ph.D., 1915; Instructor in Mathematics, Pennsylvania State College, 1915–16; Northwestern University, 1916–18; Second Lieutenant, in F. A. R. C.; Honorary Fellow in Physics, Clark University, January 1919–.

Edward Zeitfuchs, M.S.
Research Assistant to Dr. Kraus 12 Oberlin St.

B.S., University of California, 1912; M.S., Massachusetts Institute of Technology, 1918; Research Assistant in Physical Chemistry, 1917–18.

Fellows and Scholars

John Edward Bentley, A.M., Holliston
Fellow in Psychology

Graduate, Wesleyan Theological College, Montreal, 1915; Student in Psychology, Clark University, 1915–16; A.M., 1916; S.T.B., Boston University, 1917; Boston University Graduate School, 1917–18.

Phyllis Mary Blanchard, A.M., Epping, New Hampshire
Fellow in Psychology 7 Hollywood St.

A.B., New Hampshire College, 1917; Scholar in Psychology, Clark University, 1917–18; A.M., 1918.

Chung Yen Chiu, A.M., Chekiang, China
Fellow in Chemistry 766 Main St.

A.B., University of California, 1915; Student, Massachusetts Institute of Technology, 1915–16; Scholar in Chemistry, Clark University, 1916–17; A.M., 1917; Fellow, 1917–; Assistant in Chemistry, Clark College, 1918–.

Yü, Tinn Hugh, A.M., Canton, China
Fellow in Sociology 12 Oberlin St.

LL.B., Valparaiso University, 1915; Pd.B., 1917; A.B., University of Maine, 1917; Scholar in Sociology, Clark University, 1917–18; A.M., 1918.

Ping Ling, A.M., Ku Tze Shien, Ho-nan, China
Fellow in Psychology 54 Downing St.

A.B., Stanford University, 1916; A.M., Columbia University, 1917; Fellow in Psychology, Clark University, 1917–.

Mable Thurston Murray, A.M., Holliston
Fellow in History 36 Gates St.

Pd.B., University of Maine, 1917; Scholar in History, Clark University, 1917–18; A.M., 1918.

Henry Cole Parker, A.M., Highland, California
Fellow in Chemistry 766 Main St.

B.S., Kalamazoo College, 1915; Scholar in Chemistry, Clark University, 1915–16; A.M., 1916; Fellow, 1916–17; January 1919–.

Maurice E. J. Pieters, Brussels, Belgium
Fellow in Pedagogy 70 Florence St.

Graduate, École Normale de Bruxelles, 1912; Fellow in Pedagogy, Clark University, 1917–.

Mary Downey Rebboli, A.M.
Fellow in History 288 Pleasant St.

A.B., Wellesley College, 1903; A.M., 1908; Student in History, Clark University, 1915–17; Fellow 1917–; Assistant in History, Clark College, 1918–.

Winifred V. Richmond, A.M., Athens, Ohio
Fellow in Pedagogy 13 Gates St.

B.S. in E., Ohio University, 1910; Scholar in Pedagogy, Clark University, 1914–15; A.M., 1915; Fellow, 1915–16; January 1919–; Instructor in Psychology, State Normal School, Gorham, Me., 1916–17; Psychologist, Massachusetts School for Feeble-Minded, Waverley, July 1917–January 1919.

Clara Eve Schieber, A.M., Bucyrus, Ohio
Fellow in History 9 Hawthorn St.

B.S. in E., Ohio University, 1916; Scholar in History, Clark University, 1917–18; A.M., 1918.

Jesse William Sprowls, A.M.
Fellow in Pedagogy 11 Preston St.

B.S., Valparaiso University, 1910; B.S. in E., University of Pittsburgh, 1915; Professor of Education, Bethany College, 1915–17; Fellow in Pedagogy, Clark University, 1917–; A.M., 1918.

Axel Johan Uppvall, A.M.
Fellow in Psychology 26 Woodland St.

A.B., Colby College, 1905; A.M., Harvard University, 1907; Instructor in French and German, University of New Brunswick, 1909–10; Instructor in French, University of Pennsylvania, 1910–11; Professor of French and German, University of New Brunswick, 1911–16; Assistant Professor of German, Clark College, 1916–18; Honorary Scholar in Psychology, Clark University, 1917–18.

Albert Perlea Van Dusen, A. M., Northborough
Fellow in Sociology

A.B., University of Rochester, 1905; B.D., Rochester Theological Seminary, 1909; A.M., University of Chicago, 1912; Professor of Sociology, Carson and Newman College, 1912–17; Fellow in Sociology, Clark University, 1917–.

MATSUSABURO YOKOYAMA, A.M., Mito, Japan
Fellow in Psychology 52 Downing St.

Assistant in Psychology, Colorado College, 1916–17; A.B., 1917; Scholar in Philosophy, Harvard University, 1917–18; A.M., 1918.

WILLARD LOUIS OSBORN, A.B.,
Honorary Scholar in Mathematics 9 Ferdinand St.

A.B., Clark College, 1906; Instructor in Mathematics and Physics, Hobart College, 1910–14; Fellow in Mathematics, Clark University, 1914–15; Honorary Scholar, 1917–.

EMELYN NEWCOMB PARTRIDGE
Honorary Scholar in Sociology 2 Downing St.

Student in Anthropology, Clark University, 1913–14; Student in Pedagogy, 1914–15.

WILBUR COMMODORE BATCHELOR, B.P.E., Troy, New York
Scholar in Pedagogy 19 Shirley St.

B.P.E., International Y. M. C. A. College, Springfield, Mass., 1913; Professor of Physical Education and Hygiene, Rensselaer Polytechnic Institute, 1915– .

IDA LOUISE BULLARD, A.B., Clinton
Scholar in Mathematics

A.B., Mt. Holyoke College, 1918.

LEON WALTER COOK, A.B., Natick
Scholar in Chemistry 28 Hollywood St.

A.B., Clark College, 1918; Scholar in Chemistry, Clark University, January 1919–.

EUSTACE COUYUMDJOPOULOS, A.B., Beni-Suef, Egypt
Scholar in Chemistry 23 Maywood St.

A.B., Kalamazoo College, 1918.

ALBERT FARNSWORTH, PH.B.
Scholar in History 48 Beaconsfield Rd.

Ph.B., Brown University, 1910.

HERMAN FLETCHER KURTZ, A.B., Kalamazoo, Michigan
Scholar in Chemistry 23 Maywood St.

A.B., Kalamazoo College, 1918; Assistant in Chemistry, Clark College, 1918–.

WALTER WILLIAM LUCASSE, A.B., Kalamazoo, Michigan
Scholar in Chemistry 766 Main St.

A.B., Kalamazoo College, 1917; Assistant in Chemistry, Clark College, 1917–18; Scholar in Chemistry, Clark University, September 1917–February 1918; January 1919–.

LOUIS ORVILLE MACHLAN, South Lancaster
Scholar in Sociology

ELLEN AUGUSTA MAHER
Scholar in Pedagogy 766 Pleasant St.

Graduate, Worcester State Normal School, 1912; Student in Experimental Psychology, Clark University, 1916–18.

ERNEST EUGENE PRINGLE, A.B., South Lancaster
Scholar in Chemistry

A.B., Emmanuel Missionary College, Michigan, 1909; Student, University of Nebraska, 1910–11.

ALLAN GALE RICE, A.B.
Scholar in History 9 Isabella St.

A.B., Clark College, 1910; Scholar in History, Clark University, 1910–14.

MICHAEL FRANCIS ROUSE, A.M.
Scholar in Mathematics

B.S., Villanova College, 1895; A.M., 1914.

CHESTER D. STILES, A.M., Westfield
Scholar in Pedagogy

A.B., Williams College, 1900; A.M., 1909; Student in Pedagogy, Clark University, 1917–18.

OTHER STUDENTS

GERTRUDE BODE, A.B., Grafton
Student in Mathematics

A.B., Smith College, 1918; Student in Mathematics, Clark University, September 25–December 19, 1918.

THOMAS JEFFERSON CATE, B.D., Grafton
Student in Psychology

A.B., Bates College, 1908; B.D., Newton Theological Institution, 1913; Student in Psychology, Clark University, September 25–December 13, 1918.

FLORENCE CLAPP, A.B., North Grafton
Student in History

A.B., Wellesley College, 1914.

GEORGE ALLEN COE, B.H., Grafton
Student in Psychology

B.H., International Y. M. C. A. College, Springfield, Mass., 1909; Instructor in English, 1908–09; Scholar in Pedagogy, Clark University, 1913–14.

GRACE CATHERINE COFFEY
Student in Sociology 30 May St.

Graduate, Worcester State Normal School, 1905.

HELEN MAHER DOWNEY, A.M.
Student in Sociology 288 Pleasant St.

A.B., Wellesley College, 1908; Scholar in Pedagogy, Clark University, 1908–09; A.M., 1909; Student in Sociology, September 25–December 20, 1918.

MARY EARLY
Student in Sociology 97 Elm St.

Graduate, Worcester State Normal School, 1905.

KATHERINE L. JOHNSON, A.B., Grafton
Student in Psychology

A.B., Wellesley College, 1910.

FREDERICA FEITSHANS KRAUS, A.B.
Student in Biology 11 Downing St.

A.B., Kansas University, 1902; Student in Biology, Clark University, 1915–.

LAURA LEE, A.B., Hilton, New York
Student in History 10 Cottage St.

A.B., Elmira College, 1918.

ALEXANDER BENJAMIN MACLEOD, Leicester
Student in Psychology

Student, Boston University, 1900–03.

MARGARET ELIZABETH MAHER
Student in Sociology 766 Pleasant St.

Graduate, Worcester State Normal School, 1910.

LAURA GERTRUDE SMITH, Litt.B.
Student in Pedagogy 466 Pleasant St.

Litt.B., Boston University, 1910; Student in Pedagogy, Clark University, 1916–.

ATTENDANTS UPON SATURDAY COURSES

JOHN E. ASHWORTH, Webster
HARRY R. STEVENS, Grafton

FLORENCE CHANDLER 938 Main St.
Bursar, and Clerk of the University

MABEL SODERBERG 5 Hooper St
Assistant in the Bursar's office

MARY MARGARET MCLOUGLIN, S.B. 110 Vernon St.
Private Secretary to the President

ADMINISTRATION

The trustees are the ultimate source of authority in all matters pertaining to the University. They act collectively, through committees, and also through the President of the University.

DUTIES OF THE PRESIDENT OF THE UNIVERSITY

The duties of this office were defined by the Trustees, May 23, 1889, as follows:

The President of the University shall consult frequently with the Trustees on all matters that concern the welfare of the University, and attend the meetings of the Board. He shall confer with each instructor concerning the development of his department, determine the duties and authority of each, and preside at the meetings of the Faculty. He shall be the authorized medium of communication between the Board of Trustees and the officers of instruction, individually and collectively, in all matters involving the administration of the University. The enactments of the Board concerning instructors and their work, and all requests, complaints and proposals from the Faculty to the Trustees shall be made known through him. He shall exercise or provide such superintendence over buildings, apparatus, books and other property, as will secure their protection and appropriate use. Expenditures must not be ordered by any instructor of the University without his previous consent or the express authority of the Board.

These duties were more fully defined by By-Laws enacted by the Corporation, Sept. 26, 1889. These are as follows:

BY-LAWS

1. The President of the University shall preside on all public academic occasions, shall direct the official correspondence, study the wants and interests of the whole University and exercise a general superintendence over all its concerns. His first care, and that of the authorities of the University, shall be the departments already established, and next those closely related to them; but no other department shall be established until those already introduced have been brought to the highest state of efficiency then possible. All acts, however, which shall involve the expenditure of money in the administration of the University's affairs, shall be subject to the approval of the Board of Trustees or the Finance Committee for the time being.

2. As the efficiency of a University depends chiefly upon the quality of its Faculty, the Board of Trustees will hold the President to a strict but reasonable accountability for the fidelity and ability of each instructor. The President only shall have the power to select and appoint all officers of instruction, subject to the approval of the Board of Trustees. To make wise and well-considered appointments, to maintain harmony within the Faculty, and to increase their efficiency in research and instruction shall be his most important duty. If at any time the President shall be negligent in the discharge of these or other duties, or is from any cause disabled from discharging them, they may be exercised by the Board of Trustees.

3. The President of the University shall be the medium of communication between the Trustees and Instructors, individually and collectively, upon all matters within the field of

action of either body. He shall attend all meetings of the Board of Trustees, of which he shall be notified, and shall participate in their deliberations, but without the power to vote. All complaints and requests from members of one body to the other shall be made through him.

4. The President shall call and preside over all official meetings of the Instructors, and a record of their proceedings shall be kept. These records are in no case to be made known to others than the Trustees. They shall always be in the custody of the President, but may be inspected by the Trustees, or either of them, at any time.

5. The President of the University, in the absence of the Trustees or Finance Committee, shall have the entire direction and control of the persons employed about the University and not engaged in the work of instruction; the duties of all such persons shall be assigned and they shall be appointed or removed by him, subject to the approval of the Finance Committee.

6. No instructor shall order any books or apparatus, or anything connected with the work of instruction (beyond his appropriation), without the approval of the President. No expense for the care of buildings or grounds, nor for alterations or repairs within and upon the same shall be made without the approval of the Board of Trustees or the Finance Committee, such alterations or repairs in no case to exceed the appropriations made for that purpose. If the Trustees, or Finance Committee,or any person, shall make contracts in behalf of the University without authority, the officer or person making such contract shall become individually responsible therefor.

7. The officers of instruction shall be appointed for a term of from one to five years. At the end of this period the work of each instructor will be subjected to a careful scrutiny upon the results of which his reappointment shall depend, always provided, however, that any Instructor will be liable to be dis-

charged at any time for incapacity, neglect of duty or for such other cause as shall seem good to the Trustees.

8. Each Instructor shall give stated lectures to however few. He shall actively and zealously strive to maintain the highest possible standard, shall work in a spirit of hearty sympathy and coöperation, and shall encourage research by precept and, if possible, by example.

9. The foregoing By-Laws are intended to embody the provisions contained in a vote passed by the corporation on the twenty-third day of May, A.D. 1889, upon the motion of Judge Devens. (See above.) If at any time hereafter any discrepancy shall be found to exist between the two, said By-Laws shall be so far modified as to conform to the provisions of said vote.

10. No instructor shall engage in any outside professional or technical pursuit without the approval of the Board, the Finance Committee, or the President.

11. These By-Laws, or any one of them, may be changed, amended, or repealed by a vote of three-fourths at least of the Trustees at any meeting of their Board duly called, notified, and held for that purpose.

GENERAL STATEMENTS

The University now consists of eight departments, in which all its work and that of Instructors, Fellows and Scholars is grouped.

These departments are as follows:

- I. MATHEMATICS
- II. PHYSICS
- III. CHEMISTRY
- IV. BIOLOGY
- V. PSYCHOLOGY
- VI. PEDAGOGY
- VII. SOCIOLOGY
- VIII. HISTORY

THE FACULTY

The University Senate shall consist of the President and the full professors in the University.

They shall determine the general policy of the University in matters pertaining to instruction and research, formulate the requirements for the Master's and Doctor's degrees, recommend candidates for these and for all honorary degrees,—such degrees not to be bestowed without their approval.

The Senate shall also approve all appointments to the teaching staff for a term of more than one year, and also all promotions on that staff. They shall act and advise in other matters submitted to them.

The General Faculty shall consist of the President and all members of the regular teaching staff of the University. They shall appoint scholars and fellows and consider all other matters pertaining to the interests of the University that may be officially submitted to them.

Only graduate students or those of equivalent attainments are admitted to full membership in the University, except in rare and special cases.

At present no entrance examinations are required; but by testimonials, diplomas, personal interviews, or written specimens of work, the authorities must be satisfied that the applicants have scholarship enough to work to advantage, and zeal and ability enough to devote themselves to their chosen field. The methods of the University are too costly, and its energy and funds too precious, to be spent upon those who are not well trained, promising and in earnest.

It is highly desirable that candidates entering any of the eight departments shall have, beside a knowledge of the other subjects commonly taught in colleges, a reading knowledge of French and German.

For the select students who are received, it is the purpose of the University to open all its privileges and to supply every incentive possible in the way of books, facilities, and, above all, direct personal stimulus. The chief as well as the best work of this University is individual and involves daily suggestion, encouragement and direction. The limited number of students permits more or less personal instruction in each case.

CLASSES OF APPOINTEES

No clearly marked line exists between students and instructors. Fellows who have attained some degree of mastery in a special line of work sometimes give brief special courses, which may be attended by professors.

This is a stimulus to the student, and both tests and exhibits power in teaching.

I. DOCENTS

The highest residential appointment not involving membership in the Faculty is that of Docent. These positions are designed for men of marked gifts and attainments who have at least attained the doctorate and wish to engage in research, teaching, or both.

Class A. Free Docents

Each docent of this class will be expected to deliver a limited number of lectures on some topic within his department. In so doing, he shall be entirely independent of other instructors both in his choice of a special topic and his manner of treating it, and responsible only to the President of the University, by whom he shall be appointed after consultation with the head of the department. The free docent shall have command of the resources of the department in the way of books, apparatus, etc., so far as this does not interfere with its regular work. By establishing free docents, the Faculty desires not only to maintain and guarantee the fullest academic freedom, but to expose itself to all the stimulus that can come by the rivalry of younger or outside men, and to introduce new topics and new departures in old ones.

Class B. University Docents

A University docent shall engage in research and may collaborate with the head of the department or other

member of the Faculty and supplement his work. He shall be appointed by the head of the department with the approval of the President.

Habilitation of Docents

A docent of either class may prepare and read in public an habilitation address representing original work after a term of service of a length and under conditions to be determined by the Faculty for each individual case. Upon doing this, he may be formally presented with a certificate or diploma granting him the *venia docendi* or licentiate, which shall not be a title or degree, but shall attest his fitness as scholar or investigator for an academic position and shall be regarded by the University as a brevet collegiate professorship. The fee for such a certificate shall be $25, which the Faculty shall have power to remit. The compensation of a docent of either class, if any, shall be determined by the President, and the fees to be paid him by students, if any, shall be determined by the Bursar.

It is believed that the difficulties of college authorities in selecting suitable professors may be somewhat diminished by the existence of such a select body of scholars of guaranteed scientific training, ability, and approved power to teach, and that this new grade may aid in raising the standard of academic scholarship.

II. QUIZ MASTERS

Each member of the University Faculty may, with the approval of the President, appoint one or more quiz masters who with the aid of his lecture notes, or

otherwise, shall conduct review classes upon his lectures and who may hold preliminary tests, but who shall not lecture or give instruction save as review. These positions shall be regarded as honorary and as a privilege of more advanced students in perfecting their own knowledge and acquiring practice in instruction.

III. NON-RESIDENT LECTURERS

The representatives of each department may, with the approval of the President, bring eminent experts for exchange or other lectures of a special nature at any time during the academic year. They may also in return, with the approval of the President, give similar brief courses in other institutions, provided this does not interfere with their full efficiency for the work of this University.

IV. HONORARY FELLOWS

Those who have already advanced to the Doctor's degree may be appointed Honorary Fellows and given the privileges of the University, including those of the Library. In past years many who have already taken this degree, either in this country or abroad, and who are awaiting academic appointment, have found these positions both helpful for their own further research and development and also advantageous for obtaining the collegiate and university appointments that they seek.

V. CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Candidates for the Doctor's degree must have previously taken the Degree of Bachelor of Arts or have had

a substantial equivalent for the training implied by that degree.

At least one year, but in most cases three years, of graduate work are necessary for this degree. Examinations for it, however, may be taken at any time during the academic year when, in the judgment of the University authorities, the candidate is prepared, provided the requirement of one year's residence has been absolved.

For this degree one requirement is a dissertation upon an approved subject, to which it must be an original contribution of value. To this capital importance is attached. It must be reported on in writing by the chief instructor before the examination, printed at the expense of the candidate, and at least one hundred copies given to the University. However, in case of a dissertation of unusual length, or containing expensive plates, the Faculty shall have power, at the request of the candidate, to reduce this number of presentation copies to fifty.

Such formal or informal tests as the Faculty may determine shall mark the acceptance of each student or Fellow as a candidate for this degree. One object of this preliminary test shall be to insure a good reading knowledge of French and German. Such formal candidature shall precede the examination itself by a period prescribed in the special rules below.

The fee for the Doctor's degree is $25, payable before the examination. The presentation copies of the dissertation must be in the hands of the Librarian before the diploma is delivered. In exceptional cases, and by special action of the Faculty, the act of promotion may precede the presentation of the printed copies of the dissertation.

An oral, but no written, examination is required upon at least one minor subject in addition to the major before an examining jury composed of at least four members, including the head of the department and the President of the University, who is authorized to invite any person from within or without the University to be present and to ask questions. The jury shall report the results of the examination to the Faculty, who will recommend satisfactory candidates for the degree.

For the bestowal of this degree, the approbation of the Board of Trustees must in each case be obtained by their signature upon the diploma. They desire that the standard of requirements for it be kept the highest practicable, that it be reserved for those of superior ability and attainment only, and that its value be never suffered to depreciate.

It is to the needs of candidates for this degree that the lectures, seminaries, laboratories, collections of books, apparatus, etc., are especially shaped, and no pains will be spared to afford them every needed stimulus and opportunity. It is for them that the Fellowships and Scholarships are primarily intended, although any of these honors may be awarded to others.

On November 14th, 1900, the following vote was passed by the Board of Trustees:

That the University will admit candidates for the degree of Doctor of Philosophy and will confer that degree without regard to sex.

Special Rules concerning the Doctor's Degree

I. *Residence.* No candidate shall receive the degree of Doctor of Philosophy without at least one academic year's previous residence.

II. *Candidature for the Doctor's Degree.* Every applicant for the Doctor's degree shall fill out, before October fifteenth, the regular application blank provided at the office. This schedule shall be submitted to the head of the department. Before affixing his signature he shall satisfy himself, in such manner as he may desire, as to the fitness of the applicant.

III. When countersigned, this schedule shall be filed with the President, and the applicant will be examined in French and German by the annual committee for that purpose.

IV. In case of a favorable report by this committee, the applicant shall be a regular candidate for the degree.

V. Candidates complying with all preliminary conditions, including the examinations in French and German, before November first will be allowed to proceed to the doctor's examination at any time between May fifteenth following and the end of the academic year.

VI. *The Doctor's Dissertation.* The dissertation must be presented to the instructor under whose direction it is written, and reported upon by him before the doctor's examination. In every case the dissertation shall be laid before the jury of examination, at the time of examination, in form suitable for publication. This provision shall not, however, preclude the making of such minor changes later as the chief instructor may approve.

VII. The dissertation shall be printed at the expense of the candidate and the required copies deposited with the Librarian within one calendar year after the first of October following the examination. The candidate alone will be held responsible for the fulfilment of these conditions.

VIII. The favorable report of the chief instructor, filed in writing with the Clerk of the University, shall be a sufficient imprimatur or authorization for printing as a dissertation. The printed copies shall bear upon the cover and title page the statement of approval in the following words, over the signature of the chief instructor:

> A Dissertation submitted to the Faculty of Clark University, Worcester, Mass., in partial fulfilment of the requirements for the degree of Doctor of Philosophy, and accepted on the recommendation of
>
> (NAME OF CHIEF INSTRUCTOR)

IX. *Examinations for the Doctor's Degree.* The examinations for the doctor's degree may be held at any time during the academic year, provided that at least one academic year has elapsed since the completion of the preliminaries of candidature, except in the case of fulfilment of these conditions between the beginning of any academic year and November first of that year, to which case Rule V applies. The examinations shall be held at such hours and places as the President may appoint.

X. Examinations may also be held during the regular vacations of the University, but for these an additional fee of five dollars to each examiner and the reasonable travelling expenses of any examiners who are out of town, all payable in advance, will be required.

VI. CANDIDATES FOR THE DEGREE OF MASTER OF ARTS

This degree is conferred upon candidates who comply with the following requirements:

1. The candidate shall have previously taken the degree of Bachelor of Arts, or have had a substantial

equivalent for the training implied by that degree, to be determined by special vote of the Faculty; but such degree or training must involve a good preparation for the work proposed for the Master's degree, in order that it may be accepted.

2. The candidate must devote a full academic year to post-graduate work in this University after receiving the Bachelor's degree or the training accepted as its equivalent. This work shall be mainly in one department, but the candidate may do also such other work as shall be advised by the head of his principal department —whose approval of the whole course shall be necessary. In particular cases, the candidate may be allowed, by special vote of the Faculty, to divide his work between two years; but the aggregate must, in all cases, amount to a full year's work, at least.

3. The candidate must satisfy the representatives of his principal department that he has done his work faithfully and has mastered the subjects involved, by such written and oral examinations and other tests as the department may require. The head of the department shall make a written report to the Faculty of the grounds on which the candidate is recommended, specifying the amount and character of his work, and this report shall be filed in the office.

4. The candidate must present a thesis or written report on some topic included in his course or closely related to it, that shall receive the approval of the representatives of his principal department, be accepted by the Faculty, and filed in the office.

5. Every candidate recommended for the Master's degree shall pay a fee of ten dollars.

6. The Master's degree will be conferred at the annual commencement in June of any year on those candidates only who shall have made written application to be considered as such on or before January 15th preceding and shall have fulfilled all the conditions here specified at least one week before Commencement, at which time the academic year shall be regarded as ending for the purposes of section 2.

VII. SPECIAL STUDENTS NOT CANDIDATES FOR A DEGREE

Any one desiring to undertake a special and approved line of research, and whose attainments are such as to satisfy the requirements of the University, may also be received. This class includes persons who may desire to devote themselves exclusively to one or more of the special branches—mathematics, physics, chemistry, biology, psychology, pedagogy, economics and sociology, or history—but who do not care to matriculate or become candidates for a degree.

These students, provided they satisfy the heads of the departments of their training and competency in one subject, in which they must be advanced (although they may be less so, or even beginners, in other subjects), may be allowed entire freedom in their choice and combination of studies, and as special students may enjoy all the privileges of the University.

These students may, with the approval of the President, be received for less than an entire year.

VIII. PRELIMINARY CANDIDATES

Non-university students of less special or less advanced standing than the above classes, who contemplate becoming candidates for some higher degree, may also be received.

Students of this class must satisfy the authorities of the University of their attainments and that they contemplate advancing to a degree higher than that of A.B. The privileges and status of these students will be more fully defined later. They may, in exceptional cases, be elected to Scholarships.

FELLOWSHIPS AND SCHOLARSHIPS

From the George F. Hoar Fund of $100,000 provided by the generosity of Andrew Carnegie, the sum of $3,000 is now available for Junior and Senior Fellowships in the University. While the sums attached to these appointments are not fixed, a Senior Fellow may receive $200 together with the remission of fees; which makes the value of the appointment $300. A Junior Fellow may receive $100 with remission of fees, which makes the value of the appointment $200. Besides these, other appointments of Senior and Junior University Scholarships, with remission of fees, are made.

A CITIZEN'S FUND

A citizen of Worcester has given a fund of $5,000, the income of which is to be used for the aid of "some one or more worthy native born citizens of the city of Worcester who may desire to avail themselves of the advantages of the institution."

THE FIELD FUND

Mrs. Eliza W. Field has also given $500 to be called the "John White Field Fund," the income of which is "to provide for the minor needs of a Scholar or Fellow."

The following regulations apply to the award of the income of the Field Fund:

1. Regard is had to the intellectual ability of the candidate as well as to need of pecuniary assistance.
2. Only candidates who have spent three months at the University are considered.
3. The head of each department will consider and report to the Faculty desirable cases in his department.
4. Applications are received not later than December 15th, and the awards made as soon as possible after the Christmas recess.

THE ELIZA D. DODGE FUND

Mrs. Dodge has given $1,000 to be known as the "Eliza D. Dodge Fund," the income only to be expended in aid of graduate students of limited means engaged in research work.

PURPOSE AND CONDITIONS OF FELLOWSHIPS AND SCHOLARSHIPS

Fellowships at Clark University are intended for young men and women of promise who desire to pursue post-graduate studies in order to fit themselves for intellectual careers. It is desirable, but not required, that candidates for these positions should intend to proceed to the degree of Doctor of Philosophy or to equivalent attainments. In general, those intending to devote themselves to some

special branch of learning are preferred to those directly fitting themselves for one of the three learned professions, although the latter are not excluded.

No application blanks are provided, but it is desired that the candidate should state fully and in writing his previous course of study and submit testimonials or diplomas, especially such as indicate a decided preference for some particular department. These should be accompanied also, if practicable, by some specimen of the candidate's work. Applications will be considered in April and in October and should be in the hands of the President on or before the first day of either month. In special cases vacancies may be filled by appointments at any time during the year. The names of unsuccessful candidates will not be made public.

Fellows must reside in Worcester during the entire academic year, devote themselves to special studies under the direction of their instructors, and give such evidence of progress or proficiency before the end of the year as the authorities shall require. It is generally expected that they will undertake some work of research during the year. They must coöperate in promoting harmony, order, and all the ends of the University, must not teach elsewhere, and may be reappointed at the end of the year. Being intended primarily as honors, both Fellowships and Scholarships are awarded without reference to pecuniary needs, so that those Fellows able and desiring to do so may relinquish the emolument and retain the title.

Besides field work, excursions to institutions (public and private), coaching and cram classes, clubs, examinations, and other modes by which knowledge now seems best imparted and retained, the following educational methods are prominent:

Lectures. The Trustees desire that each instructor, of however few students, should prepare and deliver regular lecture courses, with diagrams, illustrative apparatus, and reference to standard text-books and the best current literature upon each topic. Advanced students are also encouraged to supplement the work of the professors by giving occasional special lectures and courses. Public lectures will be given from time to time.

Seminaries and Conferences. These are stated meetings for joint systematic work, under the personal direction of the professor, in some special part of his subject. Here students preparing theses and papers for publication in the journals edited at the University read them in incomplete form for mutual criticism and help. Here, also, the results of individual reading are reported for the benefit of all; views are freely criticised; new inquiries, methods, comparisons, standpoints, etc., suggested. From the mutual stimulus thus given many important works have proceeded and the efficiency of universities has been greatly increased.

Laboratory Work. For beginners this has been from the first the best of all forms of apprenticeship, bringing student and professor to a closer and mutually stimulating relation. Here the manipulation of apparatus is learned, processes are criticised, results obtained by other investigators are tested and methods discussed and perfected, with a view to developing that independence in research which is the consummation of scientific culture.

NOTICES

The charge for tuition, giving all the privileges of the University, but not covering the laboratory fees, is $100 per annum.

Board and lodging can be obtained near the University at very moderate rates.

Intending students will be given information, so far as possible, upon any of these or other points, in advance of official announcement, upon addressing the Clerk of the University, Miss Florence Chandler, Worcester, Mass.

All members of the University are expected to be present at the opening of each term and continue in attendance to its close.

The following are the statements and announcements of the departments for the academic year, 1919–1920.

I. MATHEMATICS

Programme for 1919–1920

INSTRUCTION IN MATHEMATICS

The chief aim of the department is to make independent investigators of such students as have mathematical taste and ability; these naturally look forward to careers as teachers of the higher mathematics in colleges and universities, and we believe that the course of training best adapted to the development of investigators is also that which is most suitable for all who would be efficient college professors, even if they are not ambitious to engage in research. The first essential of success in either of these lines is the habit of mathematical thought, and the direct object of our instruction is the acquisition of this habit by each of our students. With this end in view, we expect every student to make himself familiar with the general methods and most salient results of a large number of different branches of mathematics, conversant with the detailed results and the literature of a few branches, and thorough master of at least one special topic to the extent of making a real contribution to our knowledge of that subject.

In accordance with these principles, the instruction is given by means of introductory, advanced and special courses of lectures, seminaries, and personal guidance in reading and investigation.

The introductory courses (mostly given in alternate years) treat the following subjects:

Analytic Geometry of Conics, Higher Plane Curves, Quadrics, Higher Surfaces, and Twisted Curves; 5 hours a week, through the year.

DIFFERENTIAL EQUATIONS, AND CALCULUS OF VARIATIONS; 5 hours a week, through the year.

THEORY OF FUNCTIONS OF REAL AND IMAGINARY VARIABLES, ELLIPTIC FUNCTIONS, AND DEFINITE INTEGRALS; 5 hours a week, through the year.

THEORY OF NUMBERS; 2 hours a week, one half-year.

HIGHER ALGEBRA; 2 hours a week, through the year.

ALGEBRAIC SUBSTITUTIONS AND THEIR APPLICATION TO THE THEORY OF EQUATIONS; 2 hours a week, one half-year.

ALGEBRAIC INVARIANTS; 2 hours a week, one half-year.

FINITE DIFFERENCES; 3 hours a week, through the year.

It is expected that every student will take each course in the earliest year of his residence in which it is given, unless he has already completed an equivalent course elsewhere. The chief object of these courses is to make the student familiar with the various methods of mathematical research and the concepts of mathematical thought at the present day. Thus, for example, curves and surfaces are treated by modern methods from the beginning, with adequate consideration of the discoveries of the great geometers of recent times. The usual college courses in the theory of algebraic equations, analytic geometry, and the differential and integral calculus furnish all the necessary preparation for these introductory courses, although it is very desirable that the student be acquainted with the properties of determinants and their application to the solution of linear equations, and with the methods of solving differential equations of the simpler types. Deficiencies in these subjects may be made up by attendance on the corresponding courses in the Collegiate Department of the University.

Special advanced courses, open to all who are prepared for them, are given annually in subjects varying with the interests of the instructors and the needs of the students. These advanced courses are not repeated at regular intervals, but properly prepared students will receive the personal assistance of one or other of the instructors in reading any

subject not announced for the year in which they desire to take it.

The number and scope of the advanced courses given each year have been, thus far, regulated by the number of students qualified to profit by them and by the individual interests of the instructors; these courses will be increased, both in number and variety, whenever a real demand for such an increase shall make itself apparent. While the present purely scientific character of the University precludes instruction in strictly technical branches, we hope that the time is not far distant when the demand shall make it advisable, and increased facilities shall make it possible, to announce courses in Descriptive Geometry, Graphical Statics, Mathematical Astronomy, Vital Probabilities, and all the more important applications of mathematics to other sciences and to technical subjects. The applications of mathematics to physics already receive adequate consideration, and the further extension of such applications awaits only a demand for it on the part of students.

The subjects in which advanced courses may be expected to be given every few years include the following:

HISTORY OF MATHEMATICS.

ARITHMETIC: Numerical computations; Theory of numbers; Finite differences and the Calculus of operations; Probabilities and the Theory of errors; Continued Fractions and their Applications.

ALGEBRA: Substitution-groups and the Galois theory of equations; Invariants; Quadratic forms; Simultaneous equations (including Restricted systems); Multiple algebra.

HIGHER ANALYSIS: Differential equations, ordinary and partial; Continuous groups; Definite integrals and Fourier's series.

THEORY OF FUNCTIONS: Functions of real and complex variables; Point-aggregates; Elliptic functions; Abelian integrals.

GEOMETRY: Modern synthetic geometry; Analytic geometry of higher plane curves, higher surfaces, and twisted curves; Rational and uniform transformations of curves and surfaces; Infinitesimal geometry; Analysis situs; Quaternions; Hyperspace and non-euclidean geometry.

SYMBOLIC LOGIC.

Other courses will be given whenever there is a demand for them, as in the past. The instructors are always glad to assist students in any line of mathematics that falls within the range of their own studies. The small number of students makes it possible to give personal attention to individuals, and the intimate and confidential relation thus established between pupil and teacher is an advantage that cannot be overestimated and ought not to be left out of account by the prospective student in determining where his studies shall be pursued.

For the academic year 1919-20, the following courses of lectures are announced:

BY PROFESSOR STORY

Advanced Courses:

CONTINUED FRACTIONS AND THEIR APPLICATIONS; 3 hours a week, through the year.

HYPERSPACE AND NONEUCLIDEAN GEOMETRY; 3 hours a week, through the year.

INFINITESIMAL GEOMETRY; 3 hours a week, first half-year.

ALGEBRAIC INVARIANTS; 3 hours a week, second half-year.

SEMINARY FOR ADVANCED STUDENTS; through the year.

BY PROFESSOR TABER

Introductory Course:

DIFFERENTIAL EQUATIONS, AND CALCULUS OF VARIATIONS; 5 hours a week, through the year.

Advanced Courses:

THEORY OF BILINEAR FORMS; 2 hours a week, first half-year.

THEORY OF INTEGRAL EQUATIONS; 2 hours a week, second half-year.

SEMINARY; through the year.

BY PROFESSOR WEBSTER

[See announcement of Department of Physics, courses 19, 20, 22, 23.]

BY M. DE PEROTT

Introductory Courses:

THEORY OF NUMBERS; 2 hours a week, first half-year.

ABELIAN INTEGRALS; 2 hours a week, second half-year.

BY DR. WILLIAMS

Introductory Course:

HIGHER ALGEBRA; 2 hours a week, through the year.

While desirous of supplying all possible facilities to those who wish to pursue studies in special branches, and to those who, already occupying permanent positions, have but a limited leave of absence, we have made it our chief object to provide a thorough training for those who, having just completed a college course, have not yet entered upon their life-work. This provision consists of such courses of lectures, seminaries, and individual assistance as should enable a faithful student endowed with the proper natural ability to satisfy the requirements for the degree of Doctor of Philosophy at the end of his third year with us. The requirements for this degree have been determined by our conception of the ideal teacher, as already stated. To acquire the necessary breadth of knowledge of mathematics as a whole, the candidate is expected to attend, during his first two years, specified introductory courses of lectures on the general principles, methods, and results of all the more important branches of pure mathematics, to supplement these lectures by private reading and to take an active part in the seminary. In the seminary, a special topic more or less directly connected with the subject of some lecture, is assigned, from time to time, to each student, who is required to read it up and make an oral report upon it before the class. Each candidate for the Doctor's degree is expected to attend a number of advanced courses. He spends the greater part of his third year in the original investigation, under the constant personal guidance of one of the instructors, of a topic of his own selection. In preparing for this investigation he is required to make a practically complete bibliography of the subject and to read all the more important available articles that have been written on it. The results of the investigation, embodied in a dissertation suitable for printing, must be submitted to the instructor under whose direction the work was done, and must receive his approval before the candidate will be admitted to the final examination for the degree. This approval will not be given unless the dissertation is satisfactory in form and completeness and the results are sufficiently novel and important to constitute a real contribution to science. The dissertation is, in fact, the main criterion by which the candidate is judged, and no amount of other work will compensate for its defects.

Each of the instructors is engaged in research and has always a number of investigations planned for himself, which have often been carried to a well advanced stage but are not completed for want of time. Such incomplete investigations are given to properly prepared candidates for the Doctor's degree, and they receive from the instructor all the assistance necessary for the completion of the work, thus becoming, to a certain extent, collaborateurs with the instructor.

The preparation of a bibliography of any topic is greatly facilitated by a classified index of mathematical literature on the card-catalogue plan, which has been prepared under the supervision of Professor Story and now includes over one hundred thousand titles of periodical articles, separate memoirs, and books in all fields of pure mathematics. This index is much more complete than the Royal Society's catalogue, even in the restricted field of that catalogue (periodicals published between 1800 and 1900), and will be extended as rapidly as possible.

The ability of our graduates to carry on research and the excellence of the work actually done is assured by the regulation that each dissertation accepted by us as worthy of the degree shall be printed with the explicit approval of a member of our Faculty. It is evident that, whereas any one that has the necessary preparation and taste for mathematics may profit by the advantages here afforded, only those who have a certain amount of mathematical genius can secure the degree.

In making appointments to fellowships and scholarships we have endeavored to maintain the same high standard. We are on the lookout for mathematical geniuses; but it is difficult to determine from the evidence of others whether candidates come up to our standard or not; so that we have adopted the general policy of giving the best appointments to those only that have been with us for at least one year, and about whom we are in position to judge for ourselves. Of course, this policy could not be carried out during the earlier years of the University, and its effect is apparent in the fact that, whereas seventy-five per cent of the students that entered the mathematical department during the first three years remained with us but one year, only thirty-three per cent of those that have been admitted from 1892 to the present time left at the end of their first year. We do not mean to imply that those who left before completing our course were inferior in ability to those who remained three years, but we desire particularly to encourage men who can and will go forward to the degree.

Nearly all of those who have studied mathematics with us have adopted teaching as a profession, sixty-eight per cent are now members of college faculties, and thirteen per cent are engaged in higher school work. Those who have received the doctor's degree have generally secured at once desirable positions in which to begin their life-work, and most of them have already acquired for themselves, by distinguished ability, very decided influence in the institutions with which they are connected.

The degree of Master of Arts will be conferred upon students who complete with credit an approved course of one year and present a satisfactory thesis.

Every facility for the study of special branches will be given to properly prepared students who are not candidates for a degree, as also to those who, having already attained to the Doctor's degree (here or elsewhere), wish to continue mathematical study or investigation.

MATERIAL FACILITIES

The library is provided with the more important textbooks, treatises, and memoirs on the various branches of mathematics, as well as the principal journals and transactions of learned societies that are devoted to any considerable extent to mathematics. A list of these journals will be found below.

The mathematical department possesses a good collection of models, a Thomas arithmometer, and an Amsler planimeter with revolving table.

LIST OF JOURNALS RELATING TO THE EXACT SCIENCES IN THE UNIVERSITY LIBRARY

(On account of the European war some of the foreign journals marked "to date" are incomplete.)

AMSTERDAM.

Koninklijke akademie van wetenschappen. Verhandelingen, 1854 to date. Complete.

Revue semestrielle des publications mathématiques. 1893 to date. Complete

BALTIMORE.

American chemical journal. 1879 to date. Complete.

American journal of mathematics. 1878 to date. Complete.

Bangkok.

- Siam society. Journal. 1905-07

Berlin.

- Berliner mathematische Gesellschaft. Sitzungsberichte. 1902 to date. Complete.
- Chemisches Centralblatt. 1897 to date. Complete.
- Deutsche chemische Gesellschaft. Berichte. 1868 to date. Complete.
- Fortschritte der Physik. 1847 to date. Complete.
- Jahrbuch über die Fortschritte der Mathematik. 1868 to date. Complete.
- Journal für die reine und angewandte Mathematik. 1826 to date. Complete.
- Königlich-preussische Akademie der Wissenschaften. Mathematische und naturwissenschaftliche Mittheilungen aus den Sitzungsberichten. 1882-97. Complete.
- Zeitschrift für angewandte Chemie. 1888 to date. Complete.

Bologna.

- Istituto di. Bologna. Reale academia delle scienze.
  - Commentarii. 1731-1791. Complete.
  - Novi commentarii. 1834-1849.
  - Memorie fis. e mat. 1806-1910.
  - Memorie. 1850 to date. Complete.
  - Scientia; rivista di scienza. 1910 to date. Complete.

Boston.

- American academy of arts and sciences. Proceedings. 1870 to date. Complete.
- North American Review. 1815–1886.
- Technology review. 1899 to date. Complete.

Boulder, Colorado.

- University of Colorado. Studies. 1902 to date. Complete.

Braunschweig.

- Deutsche physikalische Gesellschaft. Berichte. 1903 to date. Complete.
- Jahresbericht über die Fortschritte der Chemie. 1847 to date. Complete.

Breslau.

- Kaiserlich-Leopoldinisch-carolinische deutsche Akademie der Naturforscher. 1843

Bruxelles.

- Académie royale des sciences des lettres et des beaux-arts de Belgique.
  - Bulletins. Ser. 3. 1889 to date.
  - Mémoires couronnés et mémories des savants étrangers. 1889-90.

Cambridge, England.

- Cambridge philosophical society.
  - Proceedings. 1843 to date. Complete.
  - Transactions. 1822 to date. Complete.

Cambridge, Massachusetts.

- Science. 1883 to date. Complete.

Charlottesville, Virginia.

- Annals of mathematics. 1884 to date. Complete.

Chicago.

- Astrophysical journal. 1895 to date. Complete.
- School science and mathematics. 1901 to date. Complete except vol. 13, Nos. 1-2.
- Terrestrial magnetism 1896 to date. Complete.

Columbia, Missouri.

- University of Missouri studies. Science series. vol. 1. 1905-07.

Dresden.

- Zeitschrift für Chemie und Industrie der Kolloide. 1906 to date. Complete.

EASTON, PENNSYLVANIA.

American chemical society.

Chemical abstracts. 1907 to date. Complete

Journal. 1879 to date. Complete.

Proceedings. 1878 to date. Complete.

Journal of industrial and engineering chemistry. 1909 to date. Complete.

EDINBURGH.

Edinburgh mathematical society. Proceedings. 1884-1907.

Edinburgh philosophical journal. 1819-1826.

Edinburgh royal society transactions. 1873 to date. Complete.

GÖTTINGEN.

Königliche Gesellschaft der Wissenschaften. Nachrichten von der k. Gesellschaft der Wissenschaften und der Georg-Augusts-universität. 1853 to date.

GREIFSWALD.

Archiv der Mathematik und Physik. 1901 to date.

HAARLEM.

Hollandsche maatschappij der wetenschappen. Archives néerlandaises des science exactes et naturelles. 1866 to date. Complete.

HALIFAX.

Nova Scotian institute of science.

Proceedings and transactions. Halifax. 1890 to date. Complete.

HALLE.

Zeitschrift für Electrochemie. 1895 to date. Complete.

HAMBURG.

Mathematische Gesellschaft. Mittheilungen. 1890 to date. Complete.

Zeitschrift für anorganische Chemie. 1892 to date. Complete.

HEIDELBERG.

Annalen der Chemie. 1832 to date. Complete.

INDIANAPOLIS.

Indiana academy of science. Proceedings. 1895-98.

ITHACA.

Journal of physical chemistry. 1896 to date. Complete.

LAWRENCE, KANSAS.

Kansas University science bulletin. 1902-1908.

LEIPZIG.

Acta Eruditorum, 1682-1731. 50 vols. Supplementa, 1692-1734. 10 vols. Indices generales, 1693-1733. 10 vols. in 5.

Nova Acta Eruditorum, 1732-1782. 13 vols. Supplementa, 1735-1739. 3 vols. in 2.

Annalen der Physik. 1824 to date. Beiblätter, 1889 to date. Complete.

Archiv für Optik. vol. 1. 1908.

Chemische Novitäten. 1905-08.

Deutsche Mathematiker-vereinigung. Jahresbericht. 1890 to date. Complete

Encyklopädie der mathematischen Wissenschaften mit Einschluss ihrer Anwendungen.

Fortschritte der Chemie, Physik und physikalischen Chemie. 1909.

Internationale Mathematiker-congresse. Verhandlungen. 1897 to date. Complete.

Jahrbuch der drahtlosen Telegraphie und Telephonie. 1908 to date. Complete

Jahresbericht über die Leistungen der chemischen Technologie. 1856 to date. Complete.

Leipzig (Continued).

- Journal für praktische Chemie. 1834 to date. Complete.
- Königlich-sächsische Gesellschaft der Wissenschaften.
  - Berichte über die Verhandlungen der mathematisch-physischen Classe. 1849 to date. Complete.
  - Abhandlungen der mathematisch-physischen Classe. 1852 to date. Complete.
- Mathematische Annalen. 1869 to date. Complete.
- Zeitschrift für Chemie. 1866-71.
- Zeitschrift für Mathematik und Physik. 1856 to date. Complete.
- Zeitschrift für physikalische Chemie. 1887 to date. Complete.
- Zeitschrift für mathematische und naturwissenschaftliche Unterricht. 1903 to date.
- Zeitschrift für wissenschaftliche Photographie, Photophysik und Photochemie. 1903 to date. Complete.

Liège.

- Société royale des sciences. Mémoires. 1843 to date. Complete.

London.

- British academy. Proceedings. 1905. 1907.
- British association for the advancement of science. Reports. 1831 to date. Complete.
- Chemical news and journal of physical science. 1904 to date. Complete.
- Chemical society of London.
  - Annual reports on the progress of chemistry. 1905 to date. Complete.
  - Journal. 1849 to date. Complete.
- Electrician. 1891 to date. Complete.
- International catalogue of scientific literature. 1902 to date. Complete.
- London mathematical society. Proceedings. 1865 to date. Complete.
- Royal Society.
  - Proceedings. 1800 to date. Complete.
  - Philosophical transactions. 1665 to date. Complete.
  - Mathematical gazette. 1896 to date. Complete.
- Nature. 1870 to date. Complete.
- Nineteenth century. 1877 to date. Complete.
- Philosophical magazine. 1798 to date. Complete.
- Physical Society of London. 1876 to date. Complete.
- Quarterly journal of pure and applied mathematics. 1857 to date. Complete.
- Quarterly review. 1809-1885.
- Science abstracts. 1898 to date. Complete.
- Science progress in the 20th century. 1907 to date. Complete.

Madison.

- Wisconsin academy of arts and sciences. Transactions. 1898.

Manila.

- Philippine journal of science. 1906 to date. Complete.

Milano.

- Annali di matematica, pura ed applicata. 1889 to date.
- Reale istituto lombardo di scienze e lettere. Classe di scienze mathematieech naturali.
  - Rendiconti. 1864-67. Complete.
  - Rendiconti. 1868 to date. Complete.
  - Memorie. 1843 to date. Complete.

MONTREAL.

Royal Society of Canada. Proceedings and transactions. 1882-1906.

München

Königlich bayerische Akademie der wissenschaften. Sitzungsberichte der mathematisch physikalischen Klasse. 1871 to date. Complete.

NEW HAVEN.

American journal of science and arts. 1871 to date. Complete.

NEW YORK.

American mathematical society.

- Annual register. 1892 to date. Complete.
- Bulletin. 1894 to date. Complete.
- Transactions. 1900 to date. Complete.

American society of biological chemists. Proceedings. 1907 to date. Complete.

Appleton's journal of literature, science and art. 1869-76.

Electrical world and engineer. 1907 to date. Complete.

Journal of biological chemistry. 1905 to date. Complete.

The Minerva. 1824-26.

New York Mathematical Society. Bulletin. 1891-94. Complete.

Popular science monthly. 1872 to date. Complete.

Physical review. 1894 to date. Complete.

OXFORD.

Messenger of mathematics. 1862 to date. Complete.

PALERMO.

Circolo matematico di Palermo. Rendiconti. 1887 to date. Complete.

PARIS.

Annales de Chemie et de physique. 1789-1908.

Annales scientifiques de l'École normale supérieure. 1864 to date. Complete.

Association française pour l'advancement des Sciences. Comptes rendus des sessions. 1873 to date. Complete.

Bulletin des sciences mathématiques. 1870 to date. Complete.

Bureau international des poids et mesures. 1881 to date. Complete.

École polytechnique. Journal. 1794 to date. Complete.

Institut de France. Académie des sciences. Comptes rendus hebdomadaires des séances. 1835 to date. Complete.

Journal de mathématiques pures et appliquées. 1836 to date. Complete.

L'éclairage électrique. 1894-1907.

L'enseigmement mathématique. 1899 to date. Complete.

Nouvelles annales de mathématiques. 1842 to date. Complete.

Revue des deux mondes. 1908 to date. Complete.

Revue générale des sciences pures et appliquées. 1903 to date. Complete.

Revue scientifique. 1863 to date. Complete.

Société chimique de Paris. Bulletin. 1858 to date. Complete.

Société mathématique de France. Bulletin. 1873 to date. Complete.

ST. PETERSBURG.

Journal of physical chemistry. (Russian Text.) Chemical section and physical section. 1909 to date.

PHILADELPHIA.

Academy of natural sciences of Philadelphia. Proceedings. 1890 to date. Complete.

American electrochemical society. Transactions. 1902 to date. Complete.

Lippincott's magazine of literature, science and education. 1868-1881.

PISA.

Il Nuovo Cimento. 1891 to date. Complete.

ROME.

Reale accademia dei lincei. Atti. Rendiconti. etc. 1847 to date.

SACRAMENTO.

Lick observatory. Publications. 1887-1903.

SALEM, MASSACHUSETTS.

American Association for the advancement of science. Proceedings. 1848 to date. Complete.

SIDNEY.

Australasian association for the advancement of science. 1888 to date. Complete.

STOCKHOLM.

Acta mathematica. 1882 to date. Complete.

Arkiv för matematik, Astronomi och fysik. 1903 to date. Complete.

Bibliotheca mathematica. 1884 to date. Complete.

STRASSBURG.

Zeitschrift für physiologische Chemie. 1877 to date. Complete.

STUTTGART.

Jarhbuch der organischen Chemie. 1908 to date. Complete.

Sammlung Chemischer und chemisch-technischer Vorträge. 1896 to date. Complete.

TOKYO.

Journal of the College of Science of the Imperial University of Japan.

Mathematico-physical society. Proceedings (Tôkyô sûgakubuturigakkwai kizi). 2nd Ser. 1901 to date. Complete.

TOULOUSE.

Université de Toulouse. Faculté des sciences. Annales. 1887 to date. Complete.

URBANA, ILLINOIS.

University of Illinois. University studies. 1900-1908.

WASHINGTON, D. C.

National academy of sciences.

Biographical memoirs. 1877 to date. Complete.

Memoirs. 1883-1902.

Reports. 1883 to date. Complete.

U. S. Bureau of Standards. Bulletin. 1905 to date. Complete.

U. S. Naval observatory. Publications 1900-1903.

U. S. Naval observatory. Astronomical and meteorological observations. 1885. 1889.

WIESBADEN.

Zeitschrift für analytische Chemie. 1862 to date. Complete.

WIEN.

Kaiserliche Akademie der Wissenschaften.

Denkschirften; mathematisch-naturwissenschaftliche Classe. 1850-1908.

Sitzungsberichte der mathematisch-naturwissenschaftlichen Classe. 1848 to date. Complete.

Monatshefte für Mathematik u. Physik. 1908.

Monatshefte für Chemie und verwandte Theile anderer Wissenschaften. 1881 to date. Complete.

WORCESTER.

The Mathematical review. 1896–97.

II. PHYSICS

The academic year 1918–1919 has proved in many ways an exceptional year for the Department of Physics, and for it as for many other undertakings the Great War has constituted a line of demarcation between the past and the future. Opportunity has been taken to rearrange the work of the Department, and to arrange the cycle of lectures on a basis of three years instead of two, thus giving opportunity for a more extensive treatment of the various subjects, while avoiding the strain of the high speed that has hitherto been necessary. Attention is also called to the new course intended for students from other departments who have not had such mathematical preparation as should be presupposed for students desiring to make a serious study of mathematical physics.

Attention should be called to the fact that the Department of Physics of Clark University is exclusively a department for graduate study and research in pure and applied physics. The experiences of the war have shown that in almost every department of activity the careful and exact methods of the physicist have been of the greatest utility. It has in fact turned out that the business of war is to a large extent an application of physics and chemistry. To those who reply that it is rather a matter of engineering the answer must be made that engineering is applied physics and chemistry, and that for many purposes an engineer may be defined as an imperfectly educated physicist. At any rate many engineering questions have been treated in this department, and many graduates of engineering schools have resorted hither for additional training. It is believed that in the future educational history of the country such resort must largely increase, and the distinction between pure and applied science be more and more broken down. At any rate success in applied science cannot be expected without thorough training in the principles of pure science. In order to set forth to the intending student the facilities of this department, stress may be laid on a number of points in which it is believed that the conditions here are exceptional.

First, the fact that the attention of the professor is not distracted from the needs of the student by other duties, which, combined with the small number of students in the department, enables an amount of personal attention to be given to each one which is perhaps unique in this country. The head of the department is able to see each student and to give him personal advice in the conduct of his researches or his studies every day if necessary. The facilities without which no graduate department of research in physics can be complete are comprised under three heads: first, a systematic course of lectures in theoretical or mathematical physics; second, a laboratory with a sufficient number of rooms for individual work and with a sufficient equipment of apparatus and an instrument shop for the speedy production of whatever may be necessary for the research in hand; third, a library containing the classic works on physics, with full sets of journals and proceedings of learned societies by which the history of progress, past and present, may be studied, and kept up-to-date by the continual purchase of the latest works. In all these directions the facilities offered by this department invite attention.

The lecture courses are so arranged as to cover in a cycle of three years all the principal subjects and methods of theoretical physics. The pursuit of them will fit the student to read and study with facility any memoirs on theoretical physics. The courses are so arranged that it is possible for a student to begin in either year of the cycle. Thus a short course in dynamics is offered every year, and the courses in electricity and partial differential equations are broken up into parts which may be taken independently one of another. The regular courses are those not marked with a star, and constitute a course of from five to seven hours weekly. The starred courses are delivered at irregular intervals, according to the demands or the presence of students of sufficient advancement.

LECTURES

1. DYNAMICS. THE FUNDAMENTAL PRINCIPLES OF DYNAMICS, INCLUDING THE USE OF THE PRINCIPLE OF HAMILTON AND THE EQUATIONS OF LAGRANGE.

This course will be repeated yearly.

2. DYNAMICS. GENERAL PRINCIPLES, EQUATIONS OF LAGRANGE AND HAMILTON, METHODS OF HAMILTON AND JACOBI, SYSTEMS OF PARTICLES.

This course is fundamental for the pursuit of all the others, and includes a detailed account of the principle of Least Action and the differential equations of Lagrange, preparatory to their application to other parts of mathematical physics such as optics and electricity.

3. MOTION OF RIGID BODIES, AND THE THEORY OF MOVING AXES.

This course takes up the theory of tops and rotating bodies, including the multifarious applications of the Gyroscope in engineering and war.

4. NEWTONIAN AND LOGARITHMIC POTENTIAL FUNCTIONS, ATTRACTION OF ELLIPSOIDS.

This course is a necessary preliminary to the study of electricity and magnetism, of hydrodynamics, and of the figure of the earth.

5. THEORY OF STRESS AND STRAIN, OF LINEAR VECTOR FUNCTIONS, AND OF ELASTICITY.

6. HYDRODYNAMICS, WAVE AND VORTEX MOTION, DYNAMICAL BASIS OF SOUND AND LIGHT.

These courses are the basis of applications of the theory of wave motion to sound, light, electro-magnetism, and earthquake waves, and to the study of meteorology.

7.* DYNAMICS OF CYCLIC AND OSCILLATORY SYSTEMS, WITH APPLICATIONS TO THE THEORY OF ELECTRICITY, SOUND AND LIGHT.

The substance of the preceding courses is contained in Professor Webster's Treatise on Dynamics, B. G. Teubner, Leipzig.

For the theory of Vibrations of all kinds, see Course 19c.

8.* THE THEORY OF RESONANCE AND OF GENERALIZED IMPEDANCE WITH APPLICATIONS TO THE MEASUREMENT OF SOUND AND TO WIRELESS TELEGRAPHY AND TELEPHONY. THE GENERAL THEORY OF MUSICAL INSTRUMENTS AND ACOUSTICAL ENGINEERING.

This course takes up Professor Webster's original researches in acoustics, and also shows how the methods there employed bear on the fundamental electrical phenomena involved in wireless telegraphy. It also takes up the practical questions involved in the design of auditoriums and questions of vibrations.

9. THE THEORY OF ELECTROSTATICS AND MAGNETOSTATICS, WITH THEIR RELATIONS TO ELASTICITY.

10. ELECTROMAGNETISM, THE THEORY OF THE ELECTROMAGNETIC FIELD IN THE QUASI-STATIONARY STATE, ELECTRIC WAVES. THE CLASSICAL THEORIES AND THE THEORY OF MAXWELL.

The substance of these courses is found in Professor Webster's Mathematical Treatise on the Theory of Electricity and Magnetism, London, Macmillan & Co.

11. RECENT DEVELOPMENTS IN ELECTRICAL THEORY, INCLUDING THE THEORY OF LORENTZ AND THE PRINCIPLE OF RELATIVITY.

The application to the theory of electrons and to the optics of bodies in motion.

12. THE THEORY OF LIGHT. PROPAGATION OF LIGHT, DIFFRACTION, REFLECTION AND REFRACTION, DISPERSION, DOUBLE REFRACTION, POLARIZATION, METALLIC REFLECTION, MAGNETO-OPTICS, X-RAYS AND CRYSTALS.

13. COMPARISON OF THEORIES OF THE ETHER.

Critical and historical examination of the various mechanical explanations of the luminiferous ether, including those of Green, McCullagh, Kelvin, Maxwell, Sommerfeld and Larmor.

14.* GEOMETRICAL OPTICS. PROPERTIES OF SYSTEMS OF RAYS, AND THEIR VARIOUS ABERRATIONS. HAMILTON'S CHARACTERISTIC FUNCTION OR EIKONAL. APPLICATIONS TO OPTICAL INSTRUMENTS.

15. THERMODYNAMICS. THERMO- AND ELECTRO-CHEMISTRY.

The establishment of the two laws of thermodynamics, and their application, by means of the methods of Gibbs and Helmholtz, to the examination of physical and chemical phenomena. Application to heat-engines, including steam, gas, and oil engines, the flow of gases and vapors, and the steam turbine. The conditions of chemical equilibrium, phenomena of electrolysis, osmotic pressure, and capillarity. Nernst's Theorem.

16. THE KINETIC THEORY OF GASES. THE MAXWELL-BOLTZMANN THEOREM AND THE ELEMENTS OF STATISTICAL MECHANICS.

17.* THE THEORY OF RADIATION AND OF A BLACK BODY.

The relations obtained from the laws of Kirchhoff, Stefan, Wien, and Planck, by the recent applications of thermodynamics.

18.* THE PHENOMENA OF CONDUCTION OF ELECTRICITY IN GASES, AND OF RADIOACTIVITY, AND THEIR BEARING ON THE STRUCTURE OF THE ATOM.

19. THE PARTIAL DIFFERENTIAL EQUATIONS OF MATHEMATICAL PHYSICS.

Laplace's Equation, Equation of Thermal and Electrical Conduction, Equation of Wave-motion, Helmholtz's Equation, Lorenz-Beltrami Equation, Telegrapher's Equation, and their special cases, in one, two or three dimensions.

This course will be divided into three parts:

a. Deduction of the Equations. Vector Analysis. The older methods, including those of Cauchy and Fourier. Developments in Series, Trigonometric Series, Legendre's, Laplace's, Bessel's, Lamé's functions.

b. Methods of Green and Riemann-Volterra, boundary problems.

c. Theory of Vibrations and Normal Functions, Genesis of Partial Differential Equations and Integral Equations.

This complete course is probably the most important of all for the theoretical physicist, and treats a great variety of subjects from the most varied fields, grouping them all into a connected system, and embracing all the methods of theoretical physics.

The above lectures are to be found in Professor Webster's Treatise on the Partial Differential Equations of Mathematical Physics, which, being in press with Teubner, has been held up for four years, but which may be expected to appear elsewhere after the war.

20. THE ELEMENTS OF INTEGRAL AND INTEGRODIFFERENTIAL EQUATIONS, AND THEIR APPLICATIONS TO MATHEMATICAL PHYSICS.

21. SELECTED CHAPTERS IN THE APPLICATION OF THEORETICAL PHYSICS TO COSMICAL PHENOMENA, INCLUDING PROBLEMS IN GEODESY, THE TIDES, METEOROLOGY, SEISMOLOGY, AND TERRESTRIAL MAGNETISM.

22. LINEAR DIFFERENTIAL EQUATIONS.

The applications of the Theory of Functions to the linear differential equations of the second order which arise in mathematical physics.

23. ORTHOGONAL SURFACES AND CURVILINEAR COORDINATES AND THEIR APPLICATIONS.

24. INTRODUCTION TO THEORETICAL PHYSICS.

This course is intended for students in other subjects than physics, whose mathematical training in college leaves something to be desired, and who nevertheless need to have some knowledge of mathematical physics. The mathematical methods needed will be carefully explained in an elementary manner.

The courses for 1919–20 will be 2, 4, 5, 9, 19a, 24. For 25, 26, 27, 28 see below.

In addition to the above formal courses there is held a weekly Colloquium, or meeting for the informal discussion of subjects not treated in the lectures, and for the presentation by the students of reports on important articles appearing in the journals. A part of the work of the colloquium consists in the systematic presentation of certain classical researches, more or less connected with the lectures, in preparing which the students make use of the original sources of information, thus gaining much acquaintance with the methods of the masters in research. The work of the colloquium has an excellent effect in training students to present their ideas in a systematic manner before an auditory.

Among the various lines of investigation now attracting the attention of physicists the following are preëminent in importance. First, the interrelations between the luminiferous ether and ordinary matter, and the modifications necessary to be made in Maxwell's theory in order to explain the known optical and electrical phenomena of bodies in motion, and that aspect of the theory which deals with the properties of the small electric bodies known as electrons. This portion of mathematical physics is extremely new, and has hardly begun to appear in university courses in this country. Second, the structure of the atoms of matter, to which the subjects of spectroscopy and the new and fascinating field of radio-activity give the most promising clew. Third, the thermodynamics of radiation in general, which is most intimately connected with the first, and about which a similar remark may be made as to the lack of instruction.

Of branches of applied physics now awaiting the attention of the mathematical physicist may be mentioned meteorology, seismology, and geophysics in general, in all of which the accumulation of experimental data is ahead of the development of theory The theory of meteorology depends on complicated applications of hydrodynamics and thermodynamics; so as to make great demands upon the mathematical physicist, but the field is a rich one to him possessed of the skill to cultivate it. The study of earthquake phenomena is one that is now becoming of great importance in this country, while the investigation of terrestrial magnetism has lately made great advances.

In addition should be mentioned the applications of mathematical physics to engineering, which become more and more important every day. In foreign countries this has long been recognized, but the American engineer is now beginning to take advantage of the courses open to him, as is instanced by his attention to the subject of electric waves, wireless telegraphy, the theory of vibrations, and the theory of the gyroscope. In order to show the variety of subjects that the physicist may treat, it may be stated that in the last few years the head of this department has been consulted, or brought into court as an expert on the motion of human bodies in an automobile accident, the gyroscope in the torpedo, the motion of spindles in the textile industry, the balancing of automobile engines and shafts, the sound of the Klaxon horn, the collapse of a building by undermining of gravel, the transmission of speech over a telephone line, and the properties of guns and projectiles. The principles underlying all these and other matters of practical importance are covered in these lectures.

It is almost obvious to the trained investigator that no one can expect to become a physicist of the first rank without a thorough training in mathematical physics, as without that the results of experiment will never be collected into a coherent system worthy the name of an exact science. Furthermore all mathematical physics must rest upon mechanics, the principles of which are of an importance transcending that of any other branch of natural science. It is for this reason that the courses in physics in this department begin with mechanics, and are developed progressively in a systematic manner. They have the advantage of having been deliberately planned for the needs of students of pure physics, as experience has shown them to be prepared by the various colleges, and of being all delivered by the same person, so that logical consistency and continuity of method are assured. The waste of time often incurred by repetitions of the same subject and of changes of notation by various instructors is thus totally avoided. Attention is called to the fact that *no branch of physics is left unprovided for in the course of lectures.*

It should be urged upon intending students to prepare themselves, not only in ordinary laboratory measurements, but also in mathematics, the lack of proper mathematical preparation being a serious drawback to the appreciation of the lectures. In particular may be recommended for study not merely those portions of the calculus which deal with the working out of many indefinite integrals, etc., but the theoretical portions which deal with the ideas of partial derivatives, definite integrals, and their practical manipulation, together with enough analytic geometry to involve the properties of lines and *surfaces* of the second order, and a fair amount of the elements of determinants. As suitable textbooks for preparation may be recommended to the student Lamb's, Osgood's or Gibson's Calculus, C. Smith's Analytical Geometries, and Muir's or Hanus's Determinants. Appell, *Eléments de l'analyse mathématique* may be very strongly recommended to the intending student for study before and during his course at the University.

It cannot be too strongly urged that the student should, from the beginning, be able to read French and German with ease and to make use of works in them.

1. The ability to read at sight specimens of scientific French and German, tested before the first of November preceding the Doctor's examination by a committee of two members of the Faculty.

2. The successful passing of an examination upon the general subject of Experimental Physics[1] and upon the subjects named above in the regular course in Theoretical Physics, as a major requirement, together with an examination in one minor subject, *to be determined in each particular case by the head of the Physical Department.* This subject will be Mathematics or Chemistry.

3. The presentation of a satisfactory dissertation, involving a substantial amount of original work, and forming a contribution of value to pure science. The presentation of the dissertation is a prerequisite to examination. The time of residence necessary for the proper fulfilment of the above requirements will generally be at least three years, of which at least one will be very largely devoted to work on the dissertation. Students will not be encouraged to enter upon the work of a dissertation until they have acquired sufficient experience to enable them to specialize with advantage.

The aim of the department is to produce physicists rather than electricians, acousticians, opticians, engineers, or narrow specialists of any sort, for although in the nature of things one will be obliged to know more of one subject than of others, yet it seems evident that no thorough knowledge of any branch can be gained without a comprehensive view over the whole subject. Without this the specialist, or the experimentalist lacking a knowledge of mathematics, will continually be falling into pitfalls which the more wary avoid. Furthermore it can be but a detriment to science to encourage research in new fields by immature and ill-prepared minds and hands.

The following statement is here inserted for the benefit of students of mathematics.

The minor in Mathematical Physics consists of the subject-matter of courses 2, 4, 5, 6, 19a 19b which are intended to constitute the equivalent of five hours a week for one year.

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[1] Every student is recommended to provide himself with Winkelmann's *Handbuch der Physik* as a work for continual reference.

The laboratory occupies three floors of one wing of a large well lighted building free from disturbances, and admirably adapted to the purposes of a physical laboratory. On the ground floor is a room extending across the end of the building forty-five feet long by twenty-two feet wide, with windows on three sides, above which are three similar rooms. A lift running from the bottom to the top floor affords means of transporting apparatus, while its shaft furnishes space for manometer or barometer tubes. In the lower room are four piers with heavy stone tops, and two others below the floor on which can be placed heavy tables.

Also on the ground floor is a large dark room, partially below ground, in which the temperature is tolerably constant, containing a very large and heavy pier. The engine and storage-battery room contains a kerosene engine and dynamo on the same foundation and sixty storage cells of ten amperes capacity, constituting the power-supply. The engine may be started at a few moments notice, even at night, but has been superseded for most purposes by a motor-generator which is driven by an external supply and furnishes all needed direct current. The storage cells are conveniently arranged so that each one is accessible from each side, from above and below, and the ventilation is excellent, while the room is as light and clean as the work-rooms. Distributing switchboards allow the current from the dynamo or any section of the battery to be supplied to any of the rooms. On the same floor are three rooms constituting the workshop, one of the most important parts of a research department of physics. The first room is devoted to wood-working and pattern-making, and accommodates also a bench for soldering. The next room contains the machinist's bench, two engine-lathes and drill-press, and the third room a Rivet precision bench-lathe, jeweler's lathe and Brown & Sharpe universal milling-machine. There is no countershafting in the building, each tool being driven by a separate electric motor, so that perfect quiet and steadiness are ensured. In the shop are executed all repairs and alterations of apparatus, and the new apparatus requiring continual experiment is constructed. Most of the principal pieces of apparatus belonging to this department have been thus constructed. In this manner, by having a mechanic always present, an extremely great economy in time and money is effected, and vexatious delays, which would otherwise completely arrest the progress of the work, are avoided. Facilities and encouragement are given to the students to construct apparatus for themselves.

On the main floor are the lecture room, the director's office, the large room used as the director's private laboratory and apparatus room, and three other convenient rooms for research. Two of these are arranged so that they may be darkened for photography, and one is heavily padded with felt for acoustical researches. The large room on the top floor is diagonally divided into two, one dark and devoted to the Rowland twenty-foot diffraction grating and other spectroscopic apparatus, and with a photographic dark room attached. Close by is a high potential battery of two thousand small storage cells. Every room in the laboratory contains sinks, gas and electric light connections, and several circuits connecting with the switch-board in the battery-room.

The laboratory is well equipped with apparatus for research, besides having the facilities above described for the construction of instruments of any sort needed for that purpose. In addition may be mentioned a large collection of diagrams illustrative of mathematical physics, many of them being originals of the figures in Professor Webster's "Electricity and Magnetism" and "Dynamics," and a number of interesting models used in teaching dynamics, thermodynamics, and electricity. Among them are Maxwell's Dynamical Top and a number of other interesting tops, Maxwell's and Rayleigh's induction models, Gibbs's, van der Waals's and other thermodynamical surfaces. This collection of drawings and models can probably not be matched in this country, and is continually being increased.

The laboratory affords so much space that it is rarely necessary to put more than one student in a single room. Every student receives personal attention in the laboratory from the professor whenever he needs it, and is continually in receipt of instruction and suggestion by personal contact, the best form in which information can be imparted. Emphasis should be laid on the advantage to the research student of the contact with a professor who has no other duties or interests than the furtherance of research, in an institution devoted to this as its main object.

THE BALLISTIC INSTITUTE

During the year, and in the desire to contribute to the work of the war, a new department of research has been opened, which is a very natural application of the methods above described, and for which the facilities already existed in high degree. This was an institute of ballistic research, in which investigations of all sorts on the properties of guns and projectiles and the physical laws involved in their operation may be made. From the time that the long-range gun began to bombard Paris from a distance of seventy miles, the subject of Ballistics was taken up in the colloquium and in lectures, and the services of every member of the department were enlisted in contributing to the subject. A paper on the Exterior Ballistics of Long-Range Guns was presented at the meeting of the American Philosophical Society at Philadelphia in April, and at the National Academy of Sciences in the same month, and several experimental papers have been read at the meetings of the latter and of the American Physical Society in December.

A plan of research of great variety has been laid down, as it turns out that there is research enough upon this subject to last for years. A small but very capable staff has been engaged, chiefly with funds from outside the University, thoroughly equipped to carry out research in the subject stated. The position of the Director as a member of the Naval Consulting Board of the United States has brought him into close touch with both the Navy and the Army and has afforded him unusual opportunities for getting acquainted with practical ballistic problems. For instance he has been invited to the Coast Artillery School at Fort Monroe, and all the publications of that school have been sent to him, as well as those of the Navy on Ballistics. Dr. Louis Thompson, who has been for several years research assistant to Professor Webster, spent two months at the Coast Artillery Training Camp at Fort Monroe, Va., taking the advanced course in Gunnery for officers.

The Department has unusual facilities for doing research of all kinds. A convenient laboratory, well equipped with all sorts of physical apparatus, with a machine-shop with all necessary machine tools and extremely competent instrument-makers, together with a staff whose chief interest and duty have always been the performance of research, furnish the necessary means; the spirit of the times, together with that enthusiasm for research which it has always been the purpose of the Department to inculcate, may be relied upon to furnish the driving power.

The subject of Ballistics, which may be defined as that of throwing a projectile so as to hit a previously designated target, demands a very great amount of knowledge of Theoretical Mechanics, of which Ballistics is a small part, as well as of Experimental Physics, of which Mechanics is a small part. It is thus evident that although Ballistics, like the larger subject of Physics, is an experimental science, its application demands a large amount of pure mathematics. Professor Webster's lectures on Theoretical Dynamics and on Partial Differential Equations have furnished the necessary preparation for theoretical work.

The subject of Interior Ballistics is an application of Thermodynamics, as well as of Elasticity and of the Dynamics of Rigid Bodies, while the Ballistics of Penetration requires mathematics of a very difficult order.

The program laid down comprises the determination of short intervals of time and the measurement of velocities of projectiles both outside and inside the gun, the recording of pressures within the gun, the vibrations of guns, the question of jump and whip, the photography of the air wave accompanying the projectile, the study of air resistance, the development of a new instrument for drawing trajectories, the applications of the gyroscope, the elastic properties of steel, and many other questions which every expert ballistician can readily suggest. It is not intended that all work shall be confined within the walls of the laboratory, but that it shall be carried, when necessary, to the external range or proving ground. Permission has been obtained to use the State Rifle Range at Shrewsbury, and an invitation has been already received to apply the first successful practical development, that of an indicator, which does for the gun what Watt's indicator does for steam and gas engines, to a large gun at the Army Proving Ground at Aberdeen, Maryland. A further practical result is the gunsight for anti-aircraft guns invented by Dr. Thompson, which is now in the hands of the Army.

To those who inquire the need for such an institute after the war, the answer may be made that the principles of physics and mathematics utilized in ballistics are of equal importance in peace or war, and that any results contributed to the subject of ballistics must inevitably help in the prosecution of all wars. The country is well awake to-day to the enormous advantage that has accrued to the Germans in the possession of a large number of scientific men thoroughly trained to methods of research. An examination of the literature of the war will show that in research this country is painfully behind. It is no reflection on the officers of our splendid Army and Navy to say that, however capable they may be, they have not up to the present moment been offered the theoretical training that should be considered necessary in the very difficult art of Ballistics or that is offered to French, Italian or German officers. As a matter of fact, so far as known, there exists at present in the whole world but one institution of the breadth here contemplated, namely the Ballistisches Institut at Charlottenburg, Berlin, presided over by Prof. Carl Cranz, whose treatise on the subject of Ballistics is classical, as his laboratory is unapproached. It is with the patriotic aim of giving to this country something of the same sort, even if very modest in size, that the present plan has been arrived at. Fortunately sufficient funds for the present year have been secured, from the National Academy of Sciences, the American Academy of Sciences, the Naval Consulting Board of the United States, and from a great arms company, so that it is certain that results of value will be obtained. It is perfectly obvious that the amount of work that can be undertaken will be in proportion to the money that can be secured. This statement is made in the hope that more money will be forthcoming in order to engage more physicists, who are daily becoming a more and more scarce commodity.

There has already been collected, in a very short time, a library on the subject of Ballistics which is probably not surpassed for quality in the United States. Every endeavor will be made to acquire every work of importance on the subject in any language so far as it may be obtained.

Staff

Arthur Gordon Webster, Ph.D., Sc.D., LL.D., Director.
Louis Ten Eyck Thompson, Ph.D., First Assistant.
Charles E. Wilder, Ph.D., Assistant and Computer.
Elmer A. Harrington, Ph.D., Assistant.
Henry Cole Parker, A.M., Assistant.
Nils Riffolt, Instrument Maker and Assistant.
Harold Hodgkinson, Machinist.

Lectures have been given during the year, and may be expected from time to time, on the following subjects:

25. Exterior Ballistics, Including High Angle Firing.
26. Interior Ballistics, Theoretical and Practical.
27. Theory of Aviation.
28. The Applications of the Gyroscope.

THE LIBRARY

In the library Clark University has one of its strongest features. With a large separate building, administered in the most liberal manner with a view to the advantage of the research student, and with ample funds for the purchase of books, its facilities in the Department of Physics can hardly be surpassed. It may be said to contain all of the most important works in many languages, and is continually kept up-to-date, any book wanted needing only to be mentioned to be procured. The library is particularly rich in journals, among which are included the transactions of the learned societies of England, France, Germany, Italy, Austria, Holland, and Belgium. Other sets are being continually added. A list of journals will be found on pages 44–49. There are few subjects connected with physics which may not be thoroughly studied in this library.

III. CHEMISTRY

It is the purpose of the Department of Chemistry to provide the student with that broad training in the fundamental principles of chemistry which shall adequately equip him for a subsequent scientific career.

A considerable proportion of the students entering this Department naturally look forward to an academic career. It is not intended, however, to provide training for such men alone; for the equipment for technical research, whether for public or private interests, requires equally a thorough familiarity with the fundamental underlying principles of science and with the methods of experimental investigation.

Whether a student shall devote himself to pure or to technical research is a matter of individual interest and inclination rather than of training. The purpose of the Department is to provide the training on lines sufficiently broad to enable the student to exercise a choice between technical and purely scientific work.

REQUIREMENTS

In addition to the formal requirements for entrance to the University, the student entering the Department of Chemistry should have a thorough knowledge of the fundamentals of chemistry, including general chemistry, qualitative and quantitative analysis, organic chemistry, and the elements of physical chemistry. The student should also have had mathematics through the elements of the calculus, and not less than two years' work in physics, including general physics, the elements of thermodynamics with labo-

ratory work in heat, and the elements of the theory of electricity and magnetism with laboratory work in electrical measurements.

Students entering this Department, who have not had the work in both physics and mathematics as outlined above, will be expected to make up the deficiency during their first year. Excellent courses in these subjects, which are open to University students, are offered in the College. Students whose training in chemistry falls below the requirements as above outlined, but who have had more extended courses in physics and mathematics may be allowed to enter the Department on condition that any deficiencies in chemistry will be made up during the first year.

A reading knowledge of French and German is indispensable for advanced work in chemistry.

Students who have done graduate work in other universities may enter the Department of Chemistry, receiving credit for residence (excepting the last year), provided the work done has been of such character as to provide the student with the necessary training.

INSTRUCTION

In order that a student may receive a broad training in chemistry, it is necessary that his time be properly distributed between class room work, research work, and library work. The Department endeavors, therefore, to keep the student occupied with these three lines of effort, without exclusion of one or more of them.

The following courses of instruction are offered:

1. Theoretical Chemistry I. Dr. Kraus. Lectures, conferences and problems. After developing the fundamental conceptions of thermodynamics, a study is made of systems comprising phases of constant composition. This is followed with a study of gaseous equilibria and

heterogeneous equilibria in systems comprising phases of constant composition.

2. Theoretical Chemistry II. Dr. Kraus. A continuation of the preceding course. The Nernst Heat Theorem is first examined together with allied matters. This is followed by a study of equilibria in systems comprising any number of phases of variable composition including electrolytic solutions. This course extends over two years.

3. Inorganic Chemistry. Dr. Kraus. This course consists of conferences in which the various elements and their compounds are discussed. The students are given numerous references to the literature. It is intended here to familiarize the student with the properties of matter in its more important forms and to bring his knowledge down to that of the current literature. Both physical and chemical properties are considered. This course thus becomes supplementary to the two preceding ones. It extends over three years.

4. The Phase Rule. Dr. Kraus. Conferences with references to the literature. A study is made of one, two and three component systems including both metallic and non-metallic substances.

5. Dispersed Systems. Dr. Kraus. Conferences with references to the literature. This course is devoted to the study of colloids and of surface phenomena in general.

6. Photochemistry. Dr. Kraus. Lectures and conferences. A study is made of the influence of radiations on chemical reactions.

7. The Process of Electrical Conduction. Dr. Kraus. Lectures and conferences. A detailed study is made of the conduction process in gases, electrolytic solutions, fused salts and metals.

8. Properties of Radioactive Elements. Dr. Kraus. Lectures and conferences. This course is devoted to a study of radioactive substances and the radiations accompanying their transformations.

9. History of Chemistry. Dr. Merigold. A course of lectures accompanied by supplementary reading. This course is intended to cover the historical development of the science in both practical and theoretical aspects. An attempt is made to give the student some knowledge of the individuality of the men whose work has resulted in the growth and development of modern chemistry. Attention will be given also to the relation of chemistry to other sciences at various periods of development.

10. Advanced Analytical Chemistry. Dr. Merigold. In this course will be considered special features of analytical chemistry, both

practical and theoretical. The work will include such topics as special analytical methods with particular reference to sources of error, limits of accuracy, and theoretical considerations; methods of exact analysis required in atomic weight work and other fields of research necessitating precise analysis. Particular attention is paid to results of recent investigation in this field.

11. ORGANIC CHEMISTRY. Dr. White. Conferences are held at which the fundamental conceptions and problems of organic chemistry are dealt with in a systematic way. Current literature, applicable to the subjects under discussion, is reviewed.

12. RESEARCH CONFERENCE. Dr. Kraus. This course is devoted mainly to a discussion of investigations which are being carried out in this laboratory.

13. GLASS BLOWING. Dr. Kraus. A brief course in the manipulation of glass, quartz, etc.

Courses 1, 3, 4, 9, 11, 12 and 13 are given during the present year. (Courses 1, 2, 3, 4, 7, 8, 9, 11, 12 and 13 will be given during the year 1919–1920.)

MINOR SUBJECT. Students choosing chemistry as major subject will be expected to take a minor in mathematics, physics, or biology. The choice of a minor subject will be made with reference to the student's previous preparation and to his ultimate aims as an investigator.

RESEARCH. In order that the student may become familiar with the methods of research and gain a knowledge of the minute details of one or more branches of chemistry he will carry on one or more researches throughout his three years of residence. Such researches will in all cases be in part experimental in nature. The subject for research may be one suggested by the student or one suggested by the instructor. In any case, the different investigations carried on in the laboratory at any one time will be largely diversified in order that the students may come into intimate contact with as many branches of chemistry as possible.

Since the student's early investigations will in all likelihood be more or less determinative of the subsequent trend

of his scientific activities, his subject for research is chosen with much care and, if possible, he is given several subjects during the course of his three years' work in the laboratory. In addition he is expected to make himself thoroughly familiar with the details of the investigations of his fellows in the laboratory.

Library Work. It is essential that the student shall acquire an adequate contemporaneous knowledge of the entire field of chemistry. This can be done only by reference to the original literature, both past and current. He is expected, therefore, to devote a considerable portion of his time to familiarizing himself with the journals, periodicals, and other important sources of information available in the Library. The various courses are given in such manner as to lead the student on in this direction.

FACILITIES

Laboratories. The Chemical Laboratories occupy the third floor of one wing of the Science Building. The floors below are occupied by the Collegiate Department of Chemistry. In addition to store rooms, offices and the Directors' Laboratory, room is provided for eight investigators. Not more than two students are assigned to one laboratory.

Owing to the crowded condition of the present quarters a new laboratory is in project This will consist of a three story building approximately 43 x 69 feet, comprising seventeen individual research laboratories, together with shop, storerooms, offices and conference room. Its construction is to be undertaken as soon as normal conditions return.

In addition to the usual equipment of a chemical laboratory, the following apparatus may be mentioned as being available for research work: A special water still for "conductivity water;" a 2-kilo balance, sensitive to one-tenth milligram; a Hilgar quartz spectograph; a Pulfrich refractometer; a Leeds and Northrup conductance apparatus, including a bridge, air condenser, telephone, and oscillator, and two one hundred and eleven thousand ohm resistance boxes (Curtis's wound); a ten thousand ohm resistance box in steps of one-tenth ohm, a Leeds and Northrup New High Sensitivity Galvanometer, several less sensitive D'Arsonval Galvanometers, a Leeds and Northrup Potentiometer, a platinum resistance thermometer together with bridge, several large capacity vacuum pumps giving pressures as low as 0.00005 mm., thermostats, motors, vacuum jacketed tubes, McLeod gauges, etc.

Through the courtesy of the American Academy, there has been placed at the disposal of the Department a specially constructed assay balance sensitive to one one-thousandth milligram provided from the Warren Fund and an automatic refrigerating machine provided from the Rumford Fund.

The Department is provided with a laboratory shop which includes a grinding wheel and bench lathe with accessories, engine lathe, drill-press and a complete equipment of small tools. The Physics Department has a well equipped shop with a competent mechanician in attendance whose services may be arranged for when required. The laboratory shop is primarily intended to be used when its use serves to save time. The shop is also equipped with an oxy-acetylene welding outfit.

Since glass apparatus forms a large part of the necessary equipment for research, the laboratory provides a complete stock of glass tubing. This includes ordinary soda glass in all sizes, which is used chiefly for glass blowing exercises; a complete stock of lead glass employed in the construction of apparatus; a stock of special glass of coefficient 3.5×10^{-6}, which is employed in apparatus where the conditions of use are especially severe. In addition there is available an unusually good stock of transparent quartz tubing, as well as of electro quartz.

A complete stock of all ordinary supplies, such as stopcocks, stoppers, rubber tubing, quartz ware, etc., is always kept on hand.

The Department is always ready to purchase special apparatus or materials required for research work, while the equipment of permanent apparatus is constantly being added to.

THE LIBRARY. The library facilities which the University affords to students in chemistry are the best obtainable. Complete sets of journals and periodicals are kept on file, together with text books, treatises, etc. New books are placed on display on the library tables and such as are of value are ordered on request.

The student has free access to the shelves and files. Tables are assigned in proximity to the book shelves where the student may leave permanently books and papers with which he is engaged. A more detailed description of the library facilities will be found elsewhere.

SCHOLARSHIPS AND FELLOWSHIPS

A considerable number of scholarships and fellowships are available for students in this Department under conditions set forth elsewhere.

DOCENTS AND HONORARY FELLOWS

Docents and Honorary Fellows are appointed under the conditions as set forth elsewhere. The Department welcomes such men as have already obtained their Doctor's degree and who for one reason or another wish to devote themselves for some time to research work. Every facility and encouragement will be afforded such men for the furtherance of their work.

DEGREES

Master of Arts. The formal requirements for this degree do not necessarily include an original investigation on the part of the candidate. However, the candidate must demonstrate that he possesses a working knowledge of the fundamental elements of the Science of Chemistry. Obviously, in the case of a science so largely founded on experimental facts as is chemistry, the power to carry on an experimental investigation constitutes one of the most simple and direct means for demonstrating that the candidate possesses the necessary scientific qualifications for this degree.

Doctor of Philosophy. The formal requirements for this degree are given elsewhere. Among other things, they include three years of residence (or its equivalent in other institutions), with attendance on lectures, and the successful completion of an investigation which constitutes a contribution to the Science of Chemistry. The requirements for a degree cannot, however, be fulfilled by merely observing the formal requirements as to residence, attendance on lectures, and the like. On the contrary, while all formal requirements must be scrupulously fulfilled, to receive the degree of Doctor of Philosophy, the candidate must clearly demonstrate that he possesses those scientific attainments which are essential to an active and productive scientific career.

IV. BIOLOGY

The work of the biological department has reference chiefly to the problems of general physiology, *i.e.*, problems dealing with or bearing upon the peculiarities of vital processes as such. In modern physiology living organisms are regarded as material systems having special and highly distinctive characteristics which are subject to analysis by the methods of the exact sciences. The problems presented by the living cell—a system consisting largely of colloidal material and distinguished by the possession of metabolism and other unique peculiarities—are most effectively approached from this point of view, and fundamental progress in general physiology has been due chiefly to the application of the sciences of physics, chemistry and physical chemistry to the analysis of the vital processes. The biological department offers instruction and facilities to those interested in the application of the physical and chemical sciences to the problems of general physiology. Students and investigators in this field will find unusually good opportunities for gaining the requisite knowledge of physics, chemistry and especially physical chemistry, and every effort will be made to correlate their work in these departments with their physiological work. Students of the physiological analysis of the reactions and behavior of normal intact organisms are offered the further advantage of coöperation with the department of psychology. Work in the physiology of development, comparative physiology, general pharmacology and other fields of research in which marine animals are especially valuable may be conducted during the summer at the Marine Biological Laboratory at Woods Hole under

the direction of Professor Lillie, and credit for work done at Woods Hole will be given in Clark University.

The laboratory is equipped with the usual apparatus and materials for work in general physiology. Any additional apparatus, animals or chemical reagents required for the purposes of any special research will be provided wherever possible. The conditions are especially favorable with regard to scientific literature. Complete files of nearly all of the important journals in zoölogy, physiology and biological chemistry are in the library, as well as a large number of special works in these sciences, and literature in other biological fields (botany, medicine) can be procured on short notice.

For admission to the laboratory students should have had adequate previous training in biology, chemistry and physics. Resident men students whose preparation in these subjects is insufficient may remove these deficiencies by taking the courses offered in Clark College. Students desiring to attend lecture courses without taking laboratory work can make special arrangements to do so.

The following courses are offered:

1. FUNDAMENTAL PROBLEMS OF GENERAL PHYSIOLOGY. This course is introductory and will deal chiefly with the physiology of the living cell from a physico-chemical point of view. The subject matter will be divided somewhat as follows: The distinctive characteristics of living as distinguished from non-living matter; chemical composition of the cell; enzyme action; the physico-chemical constitution of the cell; the nature and significance of cell-organization; the importance of the colloidal state in physiological processes; the rôle of electrolytes; the physiology of stimulation, contractility, and related processes; the general reactions and elementary behavior of intact organisms (tropisms, etc.); the general characteristics of metabolic processes (oxidations, syntheses, interchange with surroundings); cell-reproduction, fertilization, development and heredity. DR. LILLIE, *two lectures weekly, October to June.* Students with sufficient preparation will be assigned laboratory work in connection with these topics.

2. SPECIAL PROBLEMS OF GENERAL PHYSIOLOGY. A more advanced

course of lectures will be given on topics of general physiology, having especial reference to the problems under investigation in the laboratory. Hours will be arranged to suit requirements. DR. LILLIE, *October to June.*

3. BIOLOGICAL SEMINAR. The Seminar will meet once a fortnight to present results of research and to review and discuss recent literature. *October to May.*

4. SPECIAL TOPICS IN BIOLOGICAL CHEMISTRY. The aim of this course is to present in greater detail than is usually possible in a more general course, certain subjects of particular interest to students intending to undertake biochemical research. The subject at present offered is organic chemistry with especial reference to compounds and processes of biological interest. The discussions will include the physical and chemical properties of such compounds, their metabolism, and general physiological significance. DR. WHITE. *One lecture weekly, October to June.*

5. THE PHYSIOLOGY OF MARINE ORGANISMS. The course in General and Comparative Physiology, given in the summer at the Marine Biological Laboratory at Woods Hole under the direction of Dr. Lillie, is also open to properly qualified students in Clark University. Those prepared to do so may undertake research in this field. For further information regarding the work at Woods Hole students are referred to the Annual Announcement of the Marine Biological Laboratory.

V. PSYCHOLOGY

A complete course in Psychology at Clark University includes the following subjects:

1. ANATOMY AND PHYSIOLOGY OF THE BRAIN AND SPINAL CORD, sense organs, and other parts of the body, including the muscles—the organs of the will—in so far as they are concerned with mental processes—together with a good general background of biology.

2. PHYSIOLOGICAL AND EXPERIMENTAL PSYCHOLOGY, including the elementary sense-experiences; sensation and perception; the measurement of sensational intensity; space; time; reaction-times; affection and emotion; memory; association; attention; apperception; will; the "higher mental processes;" inter-relation of mind and body. For this a special laboratory is equipped.

3. COMPARATIVE AND GENETIC PSYCHOLOGY. Review of the general doctrine of evolution as a basis for the evolution of mind. Discussion of experimental and observational studies upon typical forms of animal life, beginning with the protozoa. Instincts; animal and human infancy. Childhood and adolescence.

4. ABNORMAL AND MORBID PSYCHOLOGY, as nature's experiments, *e.g.*, border-line phenomena as seen in neurotic subjects, prodigies, and geniuses; defectives, such as the blind, deaf, criminal, idiotic; mental and nervous diseases, epilepsy, phobias, neurasthenia, hysteria; morbid modifications of will, personality and emotion, etc. Special clinical facilities for this work are open to the department in the hospitals and other institutions of the city.

5. HISTORY OF PSYCHOLOGY AND PHILOSOPHY, including the chief culture institutions, history of science, medical theories, Christianity, and education generally.

6. APPLICATIONS OF PSYCHOLOGY, PEDAGOGY, including mental and moral hygiene and regimen, school organization and methods from kindergarten to university; the sex problem; defectives, etc.

7. PSYCHOANALYSIS. Freud, Janet, Jung, Adler and others. The mechanisms are considered less in their applications to sex than to fear,

anger and other emotions. The psychoanalysis of great men. Dreams, hypnotism, multiple personality, somnambulism, and the more common forms of neuroses and psychoses, the psychology of everyday life.

8. Every two years a course is given in the psychological implications of digestion, beginning with the Pawlow school and tracing the effects of food and drink on psychic processes.

9. A course of one hour a week is given on the psychology of war in general and especially of the recent war.

The aim of the Psychological Department is to cover this field as well as its instructors are able to do so in two or three years.

The following courses are announced for the academic year 1919–1920.

DR. HALL'S COURSES

Dr. Hall's courses are as follows:

1. The Psychology of the Feelings and Emotions. This course will involve a brief sketch of the history of the theories in this field and a much more extended account of the recent experimental, clinical and genetic work done in this domain. The purpose of the course is to give a clear account of the present condition of our knowledge of each of the feelings, one after another, pleasure and pain, fear, anger, sympathy, jealousy, love, hate, etc.

2. Psychogenesis. This course will begin with an account of the theories of the origin both of life and of mind, with chief emphasis upon the latter. There will be a survey of the results of experimental biology, concerning elemental life or substances that resemble it, then experiments and observations upon the simplest organisms. This will be followed by a résumé of our knowledge of certain typical forms of animal instinct up the series, and upon this basis the contributions of paleontology will be drawn upon and certain lessons as to the development of type forms of life and instinct; the horse, camel, monkey, and other typical forms will be dwelt upon at some length. This will be followed by a brief account of culture stages of the human race from the paleolithic age and that of the troglodytes up.

3. The Psychology of Religion. This falls into two halves:—first, the origin of religion, from animism and manaism up to the

ethnic religions other than the Hebrew and Christian; the latter, focussing in the psychology of Jesus, constituting part two.

4. THE PSYCHOLOGY OF APPETITE, Foods and Nutrition.

5. STUDIES IN HUMAN CHARACTER. This course begins with a consideration of current tests, scales, standards, and passes on to the higher qualities of man and the problems of race, sex, genius, talent, and the more or less systematic attempts that have been made to analyze and compare the original powers of man.

6. THE PSYCHOLOGY OF WAR.

The above outlines indicate Dr. Hall's field, from which special topics will be selected for the courses of the following year. The whole field requires two or three years, but which of the topics will be stressed during the academic year 1919–1920 will depend somewhat upon the personnel of the psychological group.

7. THE SEMINARY, at Dr. Hall's house, three hours every Monday evening through the year. This seminary has been held nearly every Monday evening, when the University was in session, since its foundation. Each member of it is supposed during the year, to present one or more papers upon his thesis or upon some other approved topic, which is later discussed. This serves to pool the special studies of each student for the benefit of the others, while the discussions serve to develop interest and quicken thought.

8. Researches with individuals on special topics and personal conferences every afternoon.

EXPERIMENTAL PSYCHOLOGY*

The primary purpose of this department is to train students for the investigation of psychological problems. The lecture courses and the Journal Club aim to familiarize the student with the history and the present status of psychological experimentation; the laboratory courses are arranged with a view to training him in experimental procedure, and equipping him for independent research.

LABORATORY

The psychological laboratory occupies a suite of twenty rooms on the upper floor of the main building of the university.

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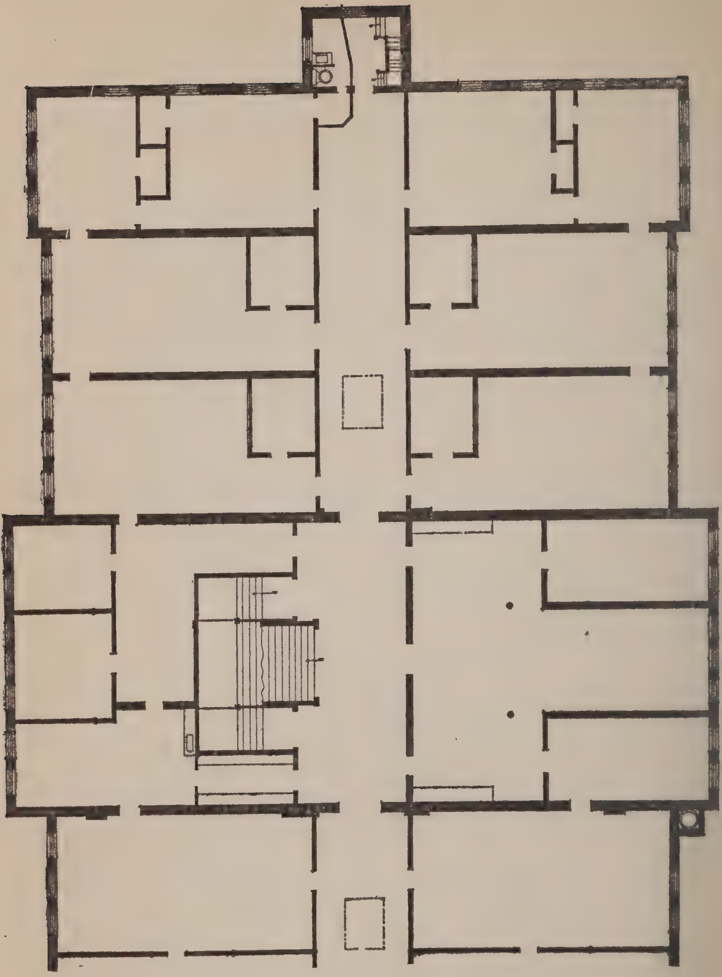
*Since writing the above, and while the register was in press, Professor Baird has died. When his successor is appointed, the University will issue a new announcement in this Department.



PSYCHOLOGICAL LABORATORY

These rooms, as at present arranged, are devoted to the following purposes: office, lecture-room, seminary-room, reading-room, dark-room, work-shop, general apparatus-room, and a group of rooms for research.

The laboratory is well equipped with general apparatus; and it has an annual appropriation sufficient to provide for the purchase and manufacture of such apparatus as is required from time to time for special investigations. The work-shop contains power- and other lathes, a power-drill, and an abundant equipment of tools and materials for the manufacture and repair of apparatus. The services of an expert mechanician are available; and every facility is provided for the devising and constructing of apparatus appropriate for the solution of such special problems as are undertaken.

The library contains an unusually large collection of psychological literature. It is especially well supplied with scientific periodicals and reports of the proceedings of learned societies. Since the enrolment of the department consists exclusively of graduate students, and is, therefore, relatively limited in numbers, it is possible to give to each student of the department a maximum of freedom in the use of the library. Besides having access to the university library, students of the laboratory have at their disposal an excellent working-library of psychological books and periodicals which are shelved in the seminary-room.

The more general and fundamental courses of lectures in the department are repeated each year, while the more advanced and specialized courses are given only in alternate years. A feature of the method of instruction at Clark University is the frequent informal conferences between instructor and student. The Journal Club meets weekly (two-hour sessions) for the discussion of the current literature. The more valuable contributions presented by the members of the Club will be published in the *American Journal of*

Psychology. The laboratory work includes an introductory course, an advanced course, an experimental course in statistical methods, and a research course. The former is designed to familiarize the student with the efficient handling of apparatus, and to acquaint him with the methods to be followed and the precautions to be observed in psychological experimentation. This course is repeated each year; it, or its equivalent, is a prerequisite to all other work in the laboratory. The advanced laboratory course is intended to supplement the introductory course; and the course in statistics aims to give to the student a working knowledge of statistical methods. The research varies from year to year.

Provision for Comparative Psychology is now made at the Hadwen Arboretum, about fifteen minutes' walk from the main building of the University, where special facilities for the care of the animals have been provided.

DR. BAIRD'S AND DR. FERNBERGER'S COURSES

[Lieutenant Fernberger has been granted leave of absence for the duration of the war. During his absence from the University his courses will be omitted, excepting in the following cases: The lecture course in General Psychology will be offered by Dr. Baird; the Introductory Experimental Course will be given under the direction of Dr. Baird and Dr. Geissler; the Advanced Experimental Course will be under the direction of Dr. Baird and Dr. Geissler.]

1. **General Psychology.** A course of lectures and demonstrations dealing with sensation, affection, attention and perception. Tnis course will present, in concrete and systematic form, the more important facts that have been yielded by the experimental investigation of the simpler mental processes, together with a discussion of theories that have been advanced from time to time. Dr. Baird. *Two hours a week. First semester.*

2. The Neurological Basis of Psychology. An elementary course dealing with the anatomy and physiology of the central nervous system and the organs of special sense. The work will be covered partly by lectures and partly by actual dissection. The central nervous system will be considered from the functional aspect as well as

a consideration of the gross and microscopic anatomy. DR. FERNBERGER. *Two hours a week, January to April.*

3. THE APPLICATION OF STATISTICAL METHODS TO PSYCHOLOGY. A course of lectures and demonstrations in which will be considered the calculations necessary for the practice of the psychophysical methods and also the relation between the methods. The distribution of relative frequencies, correlation and similar topics will also be considered. DR. FERNBERGER. *One hour a week. First semester.*

4. LABORATORY WORK IN PSYCHOLOGICAL STATISTICAL METHODS. In this course a limited and selected group of students will be given practice in the actual calculations and in the acquiring of the data that will form the basis for these calculations for the different methods discussed in Course 3. DR. FERNBERGER. *Two or three hours a week. Second Semester.*

5. THE PSYCHOLOGY OF LANGUAGE. A course of lectures dealing with an analysis of the language function, with special reference to the study of the aphasias. In this course will also be considered the anatomical basis of language, the origin of language ontogenetically and phylogenetically considered, as well as such special topics as the psychology of reading. DR. FERNBERGER. *One hour a week. Second Semester.*

6. THE PSYCHOLOGY OF MEMORY, IMAGINATION AND THE PROCESS OF LEARNING. Lectures and demonstrations dealing with the phenomena of mental acquisition and retention; imagery, association and reproduction, the phenomena of learning and forgetting, the function and development of habits. DR. BAIRD. *Two hours a week. Second semester.*

7. THE PSYCHOLOGY OF THE HIGHER INTELLECTUAL PROCESSES. The psychology of meaning, abstraction, thought, judgment, reasoning; the function and significance of imagery; the phenomena of *Bewusstheit*, *Bewusstseinslage*, *Aufgabe*, *Einstellung* and *determinierende Tendenz*. DR. BAIRD. *One hour a week.*

8. HISTORY OF PSYCHOLOGY. An outline of the development of psychological thinking; a statement and discussion of the characteristic features of the systematic doctrines embodied in the writings of representative psychologists, past and present. DR. BAIRD. *One hour a week.*

9. GERMAN TRANSLATION. A course for the rapid reading of a German psychological text. DR. BAIRD. *One hour a week.*

10. JOURNAL CLUB. A seminary for the informal discussion of current psychological literature. Meetings are held weekly throughout the year.

11. INTRODUCTORY EXPERIMENTAL COURSE. In this course the student will perform a series of standard psychological experiments, chiefly for the purpose of mastering the technique of experimentation. The course will be given by DR. BAIRD, AND DR. GEISSLER. *Four to six hours a week, throughout the year.*

12. ADVANCED EXPERIMENTAL COURSE. The object of this course is to acquaint the student with the technique of some of the more complicated apparatus used in psychological experiments. The use of the plethysmograph, pneumograph, ergograph, tapping experiments, methods of time measurement, methods of presentation of material and the like will be investigated. The student will also become acquainted with all of the special apparatus in the possession of the laboratory. DR. BAIRD and DR. GEISSLER. *Two hours a week. First semester.*

13. RESEARCH COURSE. Under this title are grouped the special investigations undertaken by students in the laboratory. *Topics and hours to be arranged.*

DR. KARLSON'S COURSES

1. HISTORY OF PHILOSOPHY. The work in philosophy at Clark University is essentially limited to a thorough, though introductory, course, including lectures and texts covering the entire history of philosophy from Thales to Schopenhauer, both inclusive, as fully as can be done in two hours a week. The instructor makes no attempt to teach systematic philosophy, logic, ethics, metaphysics, psychology, or any of the special disciplines, and deals with the history of philosophy in the sense of Zeller, Fischer, Ueberweg, and the rest, in the historic spirit, with some biographical matter, teaching the chief opinions of each important man and then passing to another, and not stressing any of the above specialties. The idea is that the historian should be metaphysician, logician, ethicist, epistemologist, psychologist, etc., just as much as was the man whose system he is expounding for the time, chiefly finishing one author before passing to another, following largely the chronological order, and teaching each system more as literature than as dogma, avoiding indoctrination, and teaching every doctrine or view sympathetically, letting the systems criticize each other, and in general reserving his own criticisms until after his sympathetic presentation has been made, and striving to fit for our examination in such a way that we can plan ultimately to require this course of all who take degrees in psychology or education. *Two hours a week.*

2. Contemporary Philosophy. A discussion of the philosophy since Schopenhauer, dealing chiefly with the Naturalistic, the Idealistic, the Pragmatic, and the Realistic tendencies in present day philosophy. Special emphasis is laid on the philosophy of such men as Haeckel, Nietzsche, Eucken, James, Bergson, etc., and an evaluation of their philosophy is attempted. The relation between philosophy and present day science is also discussed. *One hour a week.*

DR. PORTER'S COURSES

Course in Mental Evolution and Comparative Psychology. Lectures on reflexes, tropisms, instincts, habit-formation, the learning process, and other mental processes in animals. Especial emphasis will be placed on methods of experimental investigation and interpretation of results. The facts and laws of animal behavior and the relation of these to the various branches of human psychology, and other social sciences will be discussed. Some attention will be given to the applications of the findings of the study of Animal Behavior to Nature Study. Lantern slides, charts and demonstrations with apparatus with animals and human subjects. *One hour a week. First semester.*

Course in Social Psychology. Discussions of the rapidly increasing contributions to our knowledge of reflexes, instincts, and conditions of learning in so far as these explain and point to the practical control of social forces and institutions. The results of investigations of individual, comparative, applied, and social psychology are made to contribute to the understanding of the behavior of the individual when he is a member of a group. The chief sources used are: Thorndike's Original Nature of Man; McDougall's Social Psychology; Wallas' The Great Society; Ross' Social Psychology, and Trotter's Herd Instinct in Peace and War. *One hour a week.*

DR. GEISSLER'S COURSE

Psychological Practicum. Experimental demonstrations and practical exercises in the conduct of the most widely employed mental and physical tests and in the application of general intelligence scales after Binet, Goddard, Terman, Yerkes, and others, and of some of the most important educational scales and measurements; discussion of and practice in the mathematical treatment of data obtained by these methods. *One hour a week.*

The following courses offered by Professors James P. Porter and L. R. Geissler in Clark College are open to students in the University:

1. GENERAL PSYCHOLOGY. Three hours a week, throughout the year.

2. SOCIAL PSYCHOLOGY. Three hours a week, throughout the year.

3. EDUCATIONAL PSYCHOLOGY. Three hours a week, throughout the year.

4. LABORATORY COURSE IN EXPERIMENTAL PSYCHOLOGY. Three hours a week, throughout the year.

5. ADVANCED PSYCHOLOGY. Attention, feeling, emotions and will. A lecture and seminar course. Three hours, throughout the year.

At the Hadwen Arboretum, where a "station for the study of animal behavior" has been established and is now under Dr. Porter's direction, are found facilities for the study of certain forms of animal life; and here too will be found some of the illustrative material for his lectures.

PSYCHIATRY

Dr. Cowles, lecturer on Psychiatry, former head of the McLean Hospital at Waverley, Mass., will give a course at the University and the Worcester State Hospital for the Insane. Dr. Cowles's course includes the following topics with clinical demonstrations.

THE MELANCHOLIA-MANIA GROUP OF NEUROPSYCHOSES:

1–2. The dependence of Psychiatry upon Mental and General Physiology; the concept of energy fundamental; the reflex arc and integrative action of the nervous system. Relation of inhibition to anabolism, and katabolism.

3. Conduction-paths and Threshold Values: changes in physiological conditions in relation to the determination of psychical effects—normal habit—overuse and disuse—mental symptoms.

4. The Physiology and Pathology of Emotion; depression and exaltation figurative expressions in psychology, both being excitative and katabolic; relations of feeling-tone to conditions of ill-being.

5. Psychasthenia and Neurasthenia; the minor psychoneuroses—psychological automatism, fixed ideas, hysteria.

6. Mental Symptoms of Nervous Exhaustion; their genesis in reductions of functional capacity of the nervous and mental mechanism.

THE DETERIORATING PSYCHOSES:

7-10. Involution psychoses, paranoia. Dementia praecox, general paresis, senile dementia.

VI. PEDAGOGY

This department offers a course which can be taken for the degree of Doctor of Philosophy. Its work is in the closest connection with that of psychology and anthropology, and in part based on these subjects. The work in this department is intended to meet the needs of the following classes of students.

First. Those intending to teach some other specialty but who wish a general survey of the history, present state, methods, and recent advances in the field of university, professional and technical education.

Second. Those who desire to become professors of pedagogy, or heads or instructors in normal schools, superintendents, or otherwise to become experts in the work of education.

The program of the Pedagogical Department includes courses or part-courses upon the following subjects:

1. (*a*) CHILD STUDY. (*b*) PEDAGOGICAL PSYCHOLOGY. (*c*) EXPERIMENTAL PEDAGOGY. (*d*) SCHOOL HYGIENE.

2. (*a*) PRINCIPLES OF EDUCATION. (*b*) HISTORY OF EDUCATION AND REFORMS. (*c*) METHODS, DEVICES, APPARATUS, ETC.

3. (*a*) ORGANIZATION OF SCHOOLS IN DIFFERENT COUNTRIES. (*b*) PROBLEMS OF COLLEGE EDUCATION. (*c*) THE TEACHING PROFESSION. (*d*) MOTOR EDUCATION, including manual training, physical education, etc. (*e*) MORAL AND RELIGIOUS EDUCATION. (*f*) IDEALS.

The courses in pedagogy for 1919-1920 will be as follows:

DR. WILLIAM H. BURNHAM'S COURSES

A. HYGIENE OF THE SCHOOL CHILD. This course has been given in alternate years with the course on the Hygiene of Instruction. Some of the more important chapters in modern school hygiene will be considered, including such topics as: The conditions that determine growth and development. Physiological age. The physical and mental differences between children and adults. The general principles of somatic and mental hygiene. The hygiene of the senses. Modern studies of defects of sight and hearing. School diseases. The hygiene of the voice, the mouth, the teeth, the nose. Tests of ability to work and of physical condition. Medical inspection. The hygiene of discipline. The development of habits of healthful mental activity. The hygienic aspects of recent psychological studies. Problems in mental hygiene and the hygiene of instruction. The laws of nervous activity and the learning process in relation to problems of instruction. The period of study. Recesses. The optimum conditions of school work. The hygiene of the different subjects of instruction. The hygienic aspects of grading, of examinations, of discipline and of punishment. The relation of discipline to mental hygiene. *One hour a week throughout the year.*

B. PRINCIPLES OF EDUCATION. This course treats certain fundamental educational principles and involves an historical study of several important chapters in education. Such topics as the following will be included. Educational ideals. The interrelation of educational aims. The dominant aim at different stages of development. The correlation of educational forces. The family and education. The church and education. State aid and control. The scientific method in education. Antithetic educational principles. The history of nature vs. convention in education. Individualism vs. collectivism. The manifestation and influence of these educational ideals as illustrated in England, France and Germany before the war and as tested by the war. Rousseau, Pestalozzi, and other representatives of these principles. The present opportunity in education and the problems of educational reform and reconstruction. *One hour a week, throughout the year.*

C. SEMINARY. The work will be determined in part by the needs of the students who elect this course. It is hoped that each student will select, after consultation with President Hall and Dr. Burnham, a topic for special investigation. The results of such studies may be published. *One or two hours a week, throughout the year.*

DR. EDMUND C. SANFORD'S COURSE

During the year 1917–18 Dr. Sanford lectured on AN IDEAL UNIVERSITY. The course outlined the fundamental sociological, psychological and pedagogical principles that must be regarded in drawing up a satisfactory system of collegiate studies, and closed with a brief sketch of an ideal university and of an academic college in such a university. *The section met one hour a week during the first half 1917–18.*

The topic of the course for 1919–20; will be *Collegiate Education in the Recent Past and the Near Future.* The subject will be treated under the rubrics of Adaptation to the needs of the time; Adaptation to the nature of the college youth; and Improvements in the Art of College Teaching.

The courses as announced above may be modified somewhat as the needs of the students or other circumstances may require.

THE CHILDREN'S INSTITUTE

The Children's Institute, under the auspices of the Educational Department of Clark University, provides lectures in the small lecture-room on the second floor of the new wing of the library building, from nine to ten o'clock on Saturday mornings, open not only to students but to all others interested. This work varies from year to year.

The Children's Institute has a large hall with three adjacent rooms, comprising one entire floor in the new Library Building devoted to an educational museum, which is equipped with hundreds of maps, charts, diagrams, illustrative and other apparatus gathered from many countries, to ease the work of teaching and make it more effective. This material is used in various departments, but especially by that of Education.

Special attention has been given to the collection of the circulars and other publications of nearly one hundred types of child welfare organizations with which the department seeks to keep in touch.

THE LIBRARY

The library of the department has a large collection of Educational Literature, being especially rich in German and French literature, and having a large number of official reports from various countries—English, French, German, Belgian, Swedish, etc.; also town and city reports, and reports of special institutions; and a collection of French, German, and American text-books.

The books are arranged under the following heads:

1. GENERAL.
2. HISTORY OF EDUCATION.
3. EDUCATIONAL SYSTEMS.
4. THE THEORY OF EDUCATION AND SPECIAL SCHOOL SUBJECTS.
5. EDUCATIONAL PSYCHOLOGY.
6. CHILD STUDY.
7. SCHOOL HYGIENE AND PHYSICAL EDUCATION.
8. TEXT-BOOKS.
9. MISCELLANEOUS.

Many of the more common educational books are accessible in the Worcester Public Library and have not been duplicated by the University. The large collection of educational text-books in the library of the American Antiquarian Society and its valuable historical material are also accessible to the University.

The collection of educational periodicals includes a large number of the best foreign journals—English, French, German, Swedish, etc.

The nucleus of an educational museum has been formed. This is now merged with the museum of the Children's Institute, and contains a valuable collection of educational apparatus, pictures, illustrative material for language lessons, *Anschauungsunterricht*, toys, kindergarten material, maps, charts, diagrams, text-books, lantern slides, photographs, and illustrative material of various kinds in school hygiene, history, arithmetic, language, the natural sciences, etc. One room contains a collection of apparatus for the teaching of arithmetic, abacuses of various kinds, charts for counting, reckoning machines, number tablets, weights, measures, geometrical models, and astronomical charts and apparatus. Another room contains a collection of toys from different countries, a number illustrating scientific principles in physics and the like. A third room is devoted to apparatus and illustrative material in school hygiene. The collection includes seats and desks, charts illustrating good and bad posture, hygrometers, apparatus for ensuring cleanliness, for testing the air, charts illustrating the incidence of school diseases, the effects of antitoxins, etc., and a sample collection of the antitoxins for the various diseases. The main room is largely filled with pictures, models, maps, charts, and illustrative material for teaching the different school subjects and the different sciences. The catalogue of the department of school hygiene in the museum has been published. A catalogue of the toys has been prepared but not yet published. Recent important additions to the Museum includes samples of the latest hygienic seats and desks made under the direction of the Posture League; and the set of over 50 charts on School Health in the United States prepared by the Committee on School Health of the National Council of Education and the American Medical Association. Many charts, lantern slides and books have been loaned to teachers and others. This Museum is open to teachers, students, and the general public at definite times. It is now under the direction of Professor W. H. Burnham.

The *Pedagogical Seminary*, a journal issued at the University, serves as a convenient medium of publication for special investigations undertaken in the department.

VII. SOCIOLOGY

The courses of the Department of Sociology are designed primarily for those who plan to engage in teaching the subject or in some phase of practical social work. Besides a general historical survey of social theories and a critique of certain major principles of sociological interpretation, chief attention is given to an analytical study of fundamental problems and methods of approaching them. Especial attention is given to quantitative methods of study as supplying the best training for social investigation and the most effective means for displacing opinion with fact in controverted matters.

The courses outlined below indicate the scope and nature of the work offered. A major for the Ph.D. degree may be taken in this department; the required minor may be taken in Psychology, History, or Pedagogy according to the interests of the student.

Dr. Hankins offers the following courses:

1. History of Social Theories. A survey of the main contributions to sociological literature beginning with Auguste Comte. A partial list of the writers covered in 1917–18 is: Comte, Quetelet, Buckle, Bagehot, Spencer, Novicow, Worms, Kidd, de Greef, Gumplowicz, Kropotkin, Oppenheimer, Small, Ratzenhofer, Ward, Giddings, Durkheim, Sumner, Boas, Ross, Cooley, and McDougall. Attention was given to the contributions of modern biology, of anthropogeography, and of the economic determinists. Each author is taken up in turn and his viewpoints and principles analyzed and discussed. *Two hours per week.*

2. General Sociology. A series of lectures dealing with social origins and evolution and sociological analysis. Topics treated include the origin of man, of races, and of society; primitive ideas; religion, its

origin, evolution and function; the family; tribal society; the state; philosophies of history. The analysis of social factors treats the physiographic, biological, economic and psychological bases of society and such special processes as natural and artificial selection; communication; coöperation; competition; differentiation; socialization. *One hour per week.*

3. PROBLEMS OF POPULATION. Considers various laws of population as developed by Malthus, Spencer, Nitti and others; vital statistics, birth and death rates, heredity and selection with some attention to statistical methods; theories of racial decay; eugenics and race-regeneration; and biological and sociological conditions affecting the supply of genius. Lectures, reports, discussions. *One hour per week.*

4. NATURE VERSUS NURTURE. Questions of social policy frequently resolve themselves into opinions as to the relative importance of biological and environmental factors in the life of individual or group. This course begins with an analysis of the matter and methods of the works of Galton and Pearson and the contrasted works of Ward and others. There follows a survey of investigations in the mental measurements of groups and races, and such studies of social life—child mortality, poor relief, crime and delinquency, alcoholism, etc.—as may throw some light on the respective parts played by inheritance on the one hand and social custom and training on the other. *One hour per week.*

5. PROBLEMS OF SOCIAL RECONSTRUCTION. The development of the philosophy of individualism and *laissez-faire* as related to its historical conditions is sketched, its statement by Smith, Bentham, Mill and Spencer is analyzed, and its bearings and limitations considered. A discussion of the theories of justice is followed by a treatment of various special problems, such as minimum wage, unemployment, and the distribution of wealth and income, and the basis and limitations of the movement toward collectivism. *One hour per week.*

6. ELEMENTS OF STATISTICAL METHOD. A course designed to familiarize the student with present methods of handling quantitative data in social science with special reference to various kinds of averages, and measures of dispersion and of correlation. *Two hours per week.*

7. SEMINAR. Given to reports on theses and selected portions of the current literature. Special attention is given to the periodical literature dealing with population questions or with some phase of sociological inquiry. *One hour per week.*

During 1918–19 courses 2, 6, and 7 are given; for 1919—20 courses 1, 4, and 5 will probably be offered.

Dr. Mixter offers the following courses:

1. METHODS OF INDUSTRIAL REMUNERATION. The technique of the different methods of paying wages—piece rates, bonuses and premiums, with their several sub-varieties, are examined together with collateral subjects, such as time study, motion study, and investigations of fatigue. The whole ground of the relations of scientific management to labor is covered. *One hour per week.*

2. LABOR ORGANIZATION. In this course the broader aspects of what may be called labor politics are considered—the setting of standards of employment, the different types of organization of labor, the attitude of labor toward arbitration, profit-sharing and other special features of industrial relations. The new movement toward industrial democracy or management-sharing will be studied and criticised. *One hour per week.*

These courses alternate, course 2 being given in 1919–1920.

VIII

HISTORY AND INTERNATIONAL RELATIONS

The distinctive feature of the Department is the emphasis it places upon the various aspects of international relations. Without neglecting scholarly investigation in the economic, political and social life of preceding centuries, it seeks to know the past primarily in order to understand the present; to learn from a study of their historical evolution how the various nations and races have developed the characteristics and culture which mark them today; to gain a sympathetic appreciation of the best in other civilizations; and to evaluate correctly the problems and the difficulties constantly arising in the international relations and diplomacy of the family of states. The field of history covered is not limited to the United States and three or four of the older nations of Europe, but includes as well the newer and rapidly developing states of Asia, Latin-America and Africa. Political development is regarded as of no greater importance than economic, diplomatic, and social advance.

ANNUAL HISTORICAL CONFERENCES

In carrying out these features of its work, the Department has arranged annual conferences for the discussion of the history and the international relations of various lands. In 1909 the sessions dealt with the Far East, including China, India, the Philippines and Hawaii; in 1910, the Near East and Africa; in 1911, Japan and Japanese-American relations; in 1912, Recent Developments in China; in 1913, Latin America; and in 1915, the Problems

and Lessons of the World War. Altogether more than one hundred and seventy-five men have taken part in these conferences—university professors, anthropologists, leading natives, government officials, officers of the army and navy, travelers and missionaries—all of whom could speak with authority. The University students are enabled not merely to read the addresses and papers, which are issued in a series of bound volumes, but to listen to and meet these men who are both writing and making present-day history.

JOURNAL OF RACE DEVELOPMENT

The *Journal of Race Development* is another means for emphasizing present historical values. Published quarterly by the University, under the editorship of President G. Stanley Hall and Professor Blakeslee, assisted by a board of twenty-one contributing editors, the majority of them from the faculties of other Institutions, it has been a forum, during the past ten years, for the discussion of the problems which relate to the progress of races and the international relations of states. The *Journal* is of frequent service to the work of the Department, for it publishes from time to time articles and theses of advanced students, which show particular excellence.

COURSES

The various courses offered in the Department are so arranged, in cycles of two or three years, that students working for their doctorate will be enabled to secure a full program each year. Those taking History as a major are advised to elect their minor work in Sociology. In addition to the regular courses, a feature of the methods of instruction in the Department is the frequent informal conferences between instructor and student.

Professor Blakeslee offers the following courses:

1. United States History. Different periods are taken for intensive study in successive years. In 1915-16 the course dealt with the period from the formation of the Constitution to the Compromise of 1850, and included the economic and social development of the country during these years as well as the history of politics. In 1916-17, it extended from the Compromise of 1850 to the close of the Civil War, with emphasis upon the years between 1850 and 1861. It treated especially the institution of slavery as it existed in the Southern States, the origin and growth of the abolition sentiment, the doctrine of states rights and the development of the antagonism between the North and the South till its culmination in the Civil War. In 1917-18, it dealt with the Colonial period up to the formation of the Federal Constitution A critical study is made of source material, as well as of the standard authors. The introductory lectures are followed by reports presented by students upon assigned topics. *Two hours.*

2. The Expansion and the Colonial Policy of the United States. The history of the successive territorial acquisitions of the United States is traced, including the diplomatic negotiations and the relations with foreign powers. This is followed by a study of the constitutional questions involved, especially those regarding the status of newly acquired possessions and of present-day dependencies; the differences between incorporated and unincorporated territory; and the rights and privileges of inhabitants and citizens of the various lands considered. The aims and the continuity of the American Colonial policy are pointed out. *One hour.*

3. The History of American Diplomacy. This course will treat of the international relations of the United States from its beginning as an independent nation to the present day. It will trace the gradual development of American foreign policy, point out its distinctive features, and show how it has differed from the diplomacy of other countries. A familiarity with the standard books in the field will be expected, and frequent reference made to such source material as Moore's Digest and the Foreign Relations of the United States. *Two hours.*

4. International Law. While this course aims to give a knowledge of the general principles of International Law, it presents the subject with especial reference to the events and the outcome of the present war, and discusses the problem of modifying present International Law rules to meet changed world conditions. Considerable attention is also given to unsettled legal questions other than those of the war, such as

those now pending between this country and Mexico. The lectures are supplemented by discussions and by a study of the leading text writers and of cases, especially those of historic importance; and for this purpose Scott's "Cases on International Law" and Stowell and Munro's "International Cases" are followed. A number of the significant and unsettled cases are argued by the members of the class in an imaginary Hague Court. *Three hours.*

5. THE FAR EAST. The lectures deal with Russia in Asia; Japan, with its colonies, Formosa and Korea; Manchuria and Siberia, including the history and present status of the struggle for their control; China and the revolution; the Philippines and Hawaii; and the international politics of the Far East and of the Pacific Ocean. *One hour.*

6. BRITISH COLONIES AND DEPENDENCIES. A survey of the important political, economic and social conditions in the leading British possessions, especially in Canada, Australia, New Zealand, India and Egypt; and a discussion of British colonial policy and problems. *One hour.*

7. LATIN AMERICA. A survey of the history of the various countries is followed by a consideration of international diplomacy, political problems, systems of government, race questions, and economic and industrial conditions. Especial emphasis is placed upon the past and present relations, both in trade and diplomacy, between the United States and the countries of Latin America; this involves a careful study of the Monroe Doctrine. The lectures are based, in part, upon material which has been secured in a recent trip to South America. *Two hours.*

8. HISTORICAL SEMINAR. The students in the Department of History meet one evening a week in a seminar for the consideration of particular topics of historical interest and for the review of book and magazine material of especial value. Each member is expected to present reports which then form the basis for a general discussion.

The diplomatic and political aspects of the war and of the international settlement form the chief subject for study the present year. This includes the changes in the war aims of the different states, as revealed from time to time, especially those brought about by the Russian Revolution and the democratic attitude of the United States; the secret treaties, particularly those between Italy and its allies; the Russian problem, including a study of the Bolshevik movement and of the advisability of either military or economic intervention; the proposed territorial settlement, especially in regard to the new states of the Czecho-Slovaks, Jugo-Slavs, and Poles; the attitude of Japan towards China, Siberia and the islands of the South Seas; an analysis of the peace views of different political groups in the various states; the problem of Germany's former colonies and dependencies, with a consideration of the advantages of a possible international control; and, finally, the proposed League of Nations, including a comparative study of the several plans suggested.

In addition to this work the Seminar is also reviewing the more important war books which have appeared since May, 1917, when a previous study of the available war literature was completed. The Seminar is fortunate in having at hand the excellent war collection of the University Library, the second largest in the country, which already numbers six thousand volumes.

Courses 4 and 8 are given during the present University year, 1918–19.

Professor Barnes offers the following courses:

1. The History of Modern Europe since 1763. A systematic review of the leading phases in the progress of European society since the close of the Seven Years' War. The main topics considered are: the Old Régime in Europe; the rise of the middle class and the French Revolution; the restoration and the system of Metternich; the Industrial Revolution and the growth of liberalism, constitutionalism and nationalism; the revolutionary movement of 1848; the process of national unification in Germany and Italy, the emergence of the Balkan states, and the problem of the "submerged nationalities;" the policies of the several European States since 1870 with respect to such problems as political democracy, social reform, nationalism, imperialism, militarism, diplomacy and international organization. Lectures and readings. *Two hours.*

2. National Progress in the European States since 1500. A more detailed survey of the development of the more important individual European states in modern times along the lines of analysis sketched in the preceding course. During the year 1918–19 the course dealt with the historical origins of contemporary Germany. Lectures and readings. *Two hours.*

3. The History of the Intellectual Class in Europe. This course traces the changes in interests, opinions and attitudes of mind on the part of the intellectual classes from Oriental antiquity to the present day. The following are the more important topics analyzed; the antecedents of intellectual history; primitive reasoning; the general range of Greek speculation, its transmission to Western Europe by the

Romans, and its assimilation with Christian doctrine, resulting in the Christian conception of man and the world as set forth in Augustine's *City of God;* early medieval culture; the origin of the medieval universities, the revival of Aristotle and the range of university teaching in the thirteenth century; the slow decline of Scholasticism during the fourteenth, fifteenth and sixteenth centuries; the intellectual aspects of Humanism and the Protestant Revolt; the birth of the modern scientific spirit with Francis Bacon, Descartes and the scientists of the sixteenth and seventeenth centuries; Deism; the French Philosophes; the industrial, social and scientific revolutions of the nineteenth century and the resulting novel elements in contemporaneous intellectual life. Designed as a general cultural course and as the proper background for the more technical and specialized courses dealing with the history of science, philosophy and education. Lectures, based on Robinson's Outline of the History of the Intellectual Class in Europe, and assigned readings. *Two hours.*

4. THE EVOLUTION OF EUROPEAN CIVILIZATION. A general survey of the evolution of European society. It emphasizes the following phases of this process: the "prehistoric" background of European history; the rise and culture of the empires of antiquity; classical civilization in its economic and social aspects; northern European Culture before the fifth century A.D.; the amalgamation of Roman, Christian and "barbarian" elements in the medieval period; medieval agricultural and town life; the Crusades, the Commercial Revolution and the dawn of modern times; the rise of the modern national state system and the growth of the middle class; the Industrial Revolution and the resulting problems of political reform, social legislation, democracy and imperialism. Lectures and assigned readings, following Seignobos' History of Civilization and Marvin's Living Past as guides. *Two hours.*

5. THE EXPANSION OF EUROPE. This course aims to indicate the importance of the contact of European culture and institutions with those of the world at large for the development of European civilization in modern times. The course is organized about a study of: the Commercial Revolution and the period of the discoveries; the Europeanization of America and the early contacts with the Far East; the reaction of the processes of discovery and colonization upon European life and thought; the decline of the older Mercantilist imperialism; the Industrial Revolution and the rise of modern national imperialism; the partition of Africa and the European exploitation of Oceania and the Far East; the reaction of the contact with Africa and the Far East upon European

culture and institutions. Designed to supplement course 3 and to furnish a general introduction to a more intensive study of modern imperialism and international relations. Lectures, and assigned readings, based on Abbott's Expansion of Europe, Keller's Colonization, Muir's Expansion of Europe and the more detailed treatises dealing with special areas and topics. *Two hours.*

6. HISTORIOGRAPHY. A study of the methodology and literature of history as an introduction to historical research and as preparation for the teaching of history. After a few introductory lectures on the scope, aims, methods and interpretations of history, the course attempts to arrive at a critical knowledge of the status of contemporary historiography by studying the stages and processes through which it has been attained. Lectures, and readings in Bernheim, Langlois and Seignobos, Wolf, Bury, Peter, Gardiner, Balzani, Masson, Wegele, Fueter, Gooch, Jameson, Bassett, and in the chief works of some of the leading historians from Herodotus to Aulard and Gardiner. *Two hours.*

7. EUROPEAN SOCIAL HISTORY IN THE NINETEENTH CENTURY. This course is primarily concerned with the new social problems created by the Industrial Revolution and the theories and remedies which have been proposed in their solution. It devotes particular attention to: the factory system, the resulting dislocation of population and the rise of the urban age; economic liberalism and the abolition of legislation restricting industry and trade; utopian socialism and philosophical anarchism; the growth of proletarian agitation and unrest and the rise of trade-unionism; Marxian socialism and Catholic social reform; the emergence of the modern national state as an agent in social reform; the World War and its relation to social problems and reconstruction. Lectures and assigned readings. *Two hours.*

8. THE PROBLEMS OF NATIONALITY IN MODERN EUROPEAN HISTORY. A study of the evolution of the modern national state and its relation to the general currents of European history in modern times. It will deal with: the Commercial Revolution and the rise of the dynastic national state; the growth of the middle class, the French Revolution and the popularization of the sentiment of nationalism; the reaction of European thought and science in the nineteenth century upon nationality and nationalism; national unification and national sentiment; the Industrial Revolution, imperialism and nationalism; nationalism, militarism and the World War; a review of the attempts to eliminate war through diplomacy and international organization since 1600. Lectures and assigned readings. *Two hours.*

Courses 1 and 2 are given during the present University year, 1918–1919.

Professor Hulbert offers the following courses:

1. PHASES OF AMERICAN EXPANSION: a lecture course, with assigned readings; designed for students desiring to specialize in American History or teach it. Special attention will be paid to the geography of American Expansion and the reaction of different soils, climates, etc., on the various racial elements; also to the development of transportation methods as expansion factors. Many of the lectures will be illustrated. Readings will be assigned from Shaler, Semple, Matthews, Winsor, Faust, Ford, Hinsdale and Turner. *Two hours.*

2. THE BACKGROUND OF THE AMERICAN CONSTITUTION: a lecture course, one semester, using McLaughlin's Confederation and Constitution as text. A study of the medley of colonial rivalries, the centripetal and centrifugal forces which were at work making for union and disunion, the documents of unification created in colonial days, leading up to the Mount Vernon conference, the Annapolis and Constitutional conventions. Special reference will be made to the national influences of the western land problem and the Ordinances of 1784, 1785 and 1787. *Two hours.*

3. RELATION OF HISTORY TO THE SCIENCES. The purpose of this course is to examine the influence of geography, climatology, bacteriology, botany, hydrography, aerography, zoology, forestry, etc. in explaining the exploration and the distribution of population in the United States. Particular attention will be paid to study of agriculture and the influence of soils in the growth of great staple crops and the influence of these on development of provincial areas. *Two hours.*

Courses 1 and 2 are given during the present University year, 1918–19.

LIBRARY

The Library is under the control of a Library Committee, appointed by the Trustees, of which the President of the University is *ex officio* chairman. The duties of this committee are to advise concerning the arrangement, cataloguing, use of books, and other matters pertaining to the Library not reserved to the Trustees nor otherwise provided for.

LIBRARY COMMITTEE

PRESIDENT G. STANLEY HALL, *Chairman*
PRESIDENT EDMUND C. SANFORD
PROFESSOR WILLIAM E. STORY, *Secretary*

LIBRARY STAFF

LOUIS N. WILSON, *Librarian*

ASSISTANTS

EDITH M. BAKER, *Senior Assistant*
HELEN J. ELLIOT, *Cataloguer*
ETHEL A. PENNELL
MABEL O. BOICE
ETHEL S. MCCOY

The Library building is situated on the corner of Main and Downing streets. The Public Opening of the building was held January 14th, 1904. A full description of the building and of the Proceedings at the Opening will be found in the *Publications of the Clark University Library* for April, 1904 (Vol. 1, No. 3).

The College Library and study rooms occupy the lower floor of the new building, opened in September, 1910, and described in the College Record, July, 1910, Vol. 5, pp. 185–187.

The Library contains over 88,000 bound volumes and pamphlets, and the reading-room receives over 500 journals.

The books are grouped as follows:

A	Works of General Reference
B	Journals
C	Mathematics
CD	Math.-Physics
D	Physics
DE	Physical Chemistry
E	Chemistry
F	Biology, Zoölogy, Botany, Physiology, Neurology
G	Geography
H	Pathology
I	Psychology
J	Philosophy
K	Religious Psychology
L	Biography
M	Anthropology
N	Education
O	General Science
P	History
R	Political and Social Science Economics
S	English
T	Modern Languages
U	Classics
W	Practical Arts
X	Library Science
Y	Art
Z	European War

Tuesday and Friday mornings, each week, all books recently added to the library are placed upon a table in the Reference section where they remain for three days. This affords the members of the University and College an opportunity to examine the new books in all departments before they are placed upon the shelves for circulation.

About once a month, during term, by the courtesy of our booksellers, new books are placed for inspection on one of the tables in the Reference section. Any member of the University or College may recommend the purchase for the library of books thus displayed, and such recommendation will receive prompt attention.

All books are classified by the heads of departments and particular attention is paid to the needs of students engaged in research work. The library already possesses a good collection of complete sets of the best scientific periodicals. It makes liberal purchases for individual needs and supplements these by drawing upon the resources of the older and larger libraries through the inter-library loan system. During the past year 249 volumes were borrowed from, and 376 volumes lent to, other libraries. The number of books added each year is about four thousand volumes.

The publications of the Library, edited by the Librarian, and begun in October, 1903, are as follows:

VOL. I

(1) Bibliography of the Published Writings of President G. Stanley Hall. (2) Bibliography of Child Study for the Year 1902. (3) Proceedings and Addresses at the Public Opening of the Library Building of Clark University, January 1904. (4) Bibliography of Child Study for the Year 1903. (5) Preparing Manuscript for the Press. (6) Founder's Day, Clark University. (7) Bibliography of Child Study for the Year 1904. (8) The Probable Source of the Plot of Shake-

speare's Tempest. (9) Public Opening of the Art Department of Clark University, Dec. 5, 1905.

VOL. 2

(1) List of Books and Pictures in the Clark Memorial Collection. (2) Bibliography of Child Study for the Year 1905. (3) A Few Titles in Child Study. (4) Proceedings at the First Annual Banquet of the New England Association of Alumni of Clark University, and at the Banquet of the Washington, D. C., Alumni Association, 1907. (5) Bibliography of Child Study for the Year 1906. (6) Bibliography of Child Study for the Year 1907. (7) The Outlook for Research (Founder's Day Address, February 1, 1911). (8) List of Papers in the Field of Religious Psychology Presented at Clark University. (9) List of Degrees Granted at Clark University and Clark College.

VOL. 3

(1) The Relative Legibility of Different Faces of Printing Types (2) Suggestions for a Model Private Library at Clark College. (3) Bibliographies on Experimental Pedagogy. (4) Further Suggestions for a Model Private Library at Clark College. (5) Bibliographies on Educational Psychology. (6) Representative Books in Child Study. (7) Twenty-Fifth Anniversary of Clark University, 1889–1914.

VOL. 4

(1) List of Degrees granted at Clark University and Clark College, 1889–1914. (2) Alexander Francis Chamberlain. In Memoriam. (3) Bibliographies on Educational Subjects—No. 3. (4) The Universities and Investigation. Address delivered on Founder's Day, February 1, 1915. (5) Bibliographies on Educational Subjects—No. 4. Experimental and General Pedagogy. (6) Directory of Alumni, Faculty and Students. Clark University.

VOL. 5

(1) Bibliographies on Educational Subjects—No. 5. (2) Report of the President and Departments, 1916. (3) The Future of Science in America. (4) Posters and Pictures Relating to the European War. (5) Americanism in War and in Peace. (6) Bibliographies on Educational Subjects—No. 6. (7) Suggestions for the Preparation of the M. A. Thesis.

VOL. 6

(1) The War Collection at Clark University Library.

The books in the Art Department are accessible on application to the librarian, but, by the terms of the Founder's will, they cannot be taken from the building.

All the privileges of the Library are open to all members of the University, and each member has direct access to every book and journal.

The Library is open from 8 a.m. to 6 p.m. each week day from Sept. 1 to July 1. During July and August it is open from 8 a.m. to 5 p.m. from Mondays to Fridays, and on Saturdays from 8 a.m. to 12 m. The library is closed July 4th, Thanksgiving Day and Christmas Day.

Outside the University are found:

The Library of the American Antiquarian Society, organized in 1812, and containing over 125,000 volumes, accessible to all members of the University.

The Worcester Public Library, containing 600 newspapers and magazines and 200,000 volumes, has, in the past, to some extent supplemented the scientific publications purchased by the University, and all its privileges are accessible without charge.

The Library of the Worcester District Medical Society of about 12,000 volumes, is also free to all members of the University.

LIBRARY RULES

No loud talking is allowed in any part of the Library.

Every book shall be returned at the end of one calendar month from the time at which it was taken out, but may be called in at any time at the discretion of the Librarian.

Current numbers of periodicals shall not be taken out until they have been in the Library ten days.

All dictionaries, cyclopædias, and books of general reference are permanently reserved.

Reserved books and current numbers of periodicals, exempt from circulation, may be taken out after 5 p.m., but must be returned before 9 o'clock the next morning, excepting that such books and periodicals may be taken out Saturdays at 12 o'clock, and may be kept until 9 o'clock the next Monday morning.

Readers must not write nor make any mark upon any book, manuscript, map, or other property belonging to the Library.

Any breach of the above Rules will involve suspension of the Library privileges until personally restored by the Librarian. All such cases shall be laid before the Library Committee at their next meeting.

ART DEPARTMENT

In his last will and testament the Founder of the University bequeathed

> "the sum of $100,000, as an endowment fund for the Art Department of said University, and said sum is to be held and kept sacred and intact as a principal not to be used or expended under any conditions; but the income, interest or proceeds thereof shall be used only in putting and keeping said works of art or others given or obtained for said department in good condition and in taking care of them; and then if there is a surplus of the income of said fund left, I will and direct that it be used in the purchase of additional works of art or of such matters as will add to the usefulness and efficiency of said Art Department."

Under these conditions a large room has been furnished and equipped on the upper floor of the Library Building. Upon the death of Mrs. Clark, those of the Founder's collections that were deemed most suitable for this purpose were arranged and displayed in this room, together with his most valuable books, which, by the conditions of the will, cannot be removed from the building. A complete catalogue of these books and paintings has been published in the PUBLICATIONS OF THE LIBRARY, Vol. 2, No. 1.

A Curator and Custodian have been appointed by the Board (see page 114) and all the collections are now accessible to visitors. The Art Department is open daily (except Sundays) from 9 a.m. to 5 p.m.

Three portraits and one landscape painting have been added to the collection:

1909. Portrait of the late Carroll D. Wright, President of the Collegiate Department from 1902 to 1909, by the late Frederick P. Vinton of Boston. This painting was awarded the Temple Gold Medal at the 1909 Exhibition of the Pennsylvania Academy of Fine Arts.

1911. Portrait of G. Stanley Hall, President of Clark University, by the late Frederick P. Vinton of Boston.

1913. Landscape painting "Snowing," by Joseph H. Greenwood of Worcester.

1914. Portrait of Edmund C. Sanford, President of Clark College since 1909.

To commemorate the twenty-fifth anniversary of the University the Board of Trustees, early in 1914, commissioned Mr. Victor D. Brenner of New York to prepare a medal to mark that event. The medal is made of bronze and is three inches in diameter. On the obverse is delineated the head of President Hall, and on the reverse a beautiful allegorical group symbolizing the spirit of the University, and the legend,

> "Knowledge is proud that he has learned so much,
> Wisdom is humble that he knows no more."

Scale models of the buildings and the University grounds have been made by T. J. McAuliffe and Son of Worcester, under the direction of the architects, Messrs. Frost and Chamberlain.

During the past year more pictures, cartoons and posters relating to the European War have been purchased. The collection now numbers nearly 6000 items.

REGULATIONS

1. All requisitions for apparatus must be made through the Bursar's office upon printed blanks provided for that purpose and signed by a member of the staff.

2. So far as possible, orders for only the kind and amount of apparatus certain to be used during the year shall be placed; nothing shall be ordered for future years, and apparatus for research shall take precedence over that for teaching and illustration only.

3. Requisitions for repairs, furniture, plumbing and work about the buildings must be made through the Bursar's office in writing and with detail, and, when once passed upon, no change involving additional expense can be made in the requisition without the consent of the Finance Committee.

4. No unappropriated rooms and no part of the University grounds shall be used for any purpose, and appropriated rooms shall not be used for other purposes than the stated University work for which they were intended, without previous permission from the office.

5. Unless for special reasons, absence of instructors from their stated exercises or from town for two consecutive week days in term time should be announced at the office, and for longer absence permission should be obtained beforehand.

6. The Trustees desire that no Instructor, Docent, or

Fellow shall enter upon other engagements outside his proper work in the University of a kind or amount likely to lessen his full efficiency for science within the University.

7. Appropriations shall hereafter cover all apparatus and supplies of whatever nature for laboratories, for demonstration or illustration; all metal and carpenter work connected with the scientific activity of each department; and every form of special service. Appropriations, however, shall not hereafter cover orders for books or journals, which shall be submitted to the Library Committee.

8. The several appropriations made to individual instructors and others shall be the full and fixed limit of the liability of the University, to be on no account transcended; and for every excess over the appropriations, from whatever cause, the instructor making the order shall be personally responsible.

9. No order for any purpose shall be paid by the University, whether on appropriations or for general supplies, that has not passed through the Bursar's office.

10. The President, Professors, Assistant Professors and regular Instructors authorized by the Board to do graduate work, together with the Librarian, shall constitute the Faculty of the University. Its meetings shall be called and presided over by its President, or, in his absence, by a Professor whom he shall designate. The Faculty shall elect a Secretary and its records shall always be accessible to the Trustees. Its jurisdiction shall include all matters pertaining to the instruction, conduct and discipline of students, and such other duties as may be prescribed by the Trustees.

11. The President of the University shall make, at the October meeting of the Board, an annual report on the condition of the departments and their work during the year and shall have authority to require and receive from all Instructors and Officers of the University and Library such reports as he may deem necessary. A copy of these reports, including that of the Library, shall be deposited with the Mayor of the City.

12. The University Faculty shall have the oversight of all graduate work and shall recommend for the Master's, Doctor's and all other graduate degrees upon such terms, conditions, and forms as it may determine, and exercise such other functions and responsibilities as are not expressly assigned to the Trustees or to the Collegiate Department.

13. The Custodian of the Art Collection shall have general oversight over its room in the Library Building and its contents, together with their care and use, under the direction and control of the Curator. The Curator shall from time to time submit to the Trustees his recommendations for the purchase of additional works of art from the income of the Art Fund, based on and together with the opinions of experts as to their value and desirability. All such purchases shall be approved by the Board of Trustees, or by such a committee of their members as they shall appoint for that purpose.

14. The President of the University shall make an annual report to the Trustees of the action of the Library Committee, of which he is Chairman, and this report, if approved, shall be filed and preserved.

DEGREES CONFERRED

On June 20, 1918, the University conferred degrees on the following persons:

MASTER OF ARTS

PHYLLIS MARY BLANCHARD
Thesis: A Psycho-analytic Study of Auguste Comte
FRED JOSEPH BRENNAN
Thesis: American-Japanese Relations since the Russo-Japanese War
RALPH HADLEY BULLARD
Thesis: A Study of the Solubility of Some Borate Glasses in Water
CLARENCE NICHOLS HICKMAN
Thesis: Measurement of Inductance and Capacity in Oscillating Circuits
THOMAS BENJAMIN HILL
Thesis: Progress of Education in India
YÜ, TINN HUGH
Thesis: The Recent Chinese Revolution
EARL NELSON JOHNSTON
Thesis: Precipitation Structures Simulating Organic Growths
CARL EDMUND JONES
Thesis: A Genealogical Study of Population
TOMEHACHI KAWAMURA
Thesis: Some Reactions of Triphenylmethyl and Its Derivatives in Liquid Ammonia
BLANCHE LAURETTA MURPHY
Convent Education
MABLE THURSTON MURRAY
The Virgin Islands: Their History, Strategic and Political Value
ANNA WADE O'NEILL
Thesis: The Principles of Federal Government

Ellery Francis Reed
Thesis: Social Radicalism as Illustrated by the Industrial Workers of the World
Clara Eve Schieber
Thesis: The History of the Russian Revolution
Jesse William Sprowls
Thesis: The Freudian Child

DOCTOR OF PHILOSOPHY

Austin Perry Finley
Dissertation: Psychoanalysis of Mysticism
Thomas Hancock
Dissertation: Psychology of the Ethics of Jesus
James King
Dissertation: The Psychology of St. Paul
Shinichi Kurihara
Dissertation: The Theories of Memory
Ivan Eugene McDougle
Dissertation: Slavery in Kentucky (1792–1865)
Iva Lowther Peters
Dissertation: Woman and the Institutional Taboo

PUBLICATIONS

A Register and Official Announcement is issued each year in January or February.

In the years 1890, 1891, 1893, 1902 and 1916, the annual Report of the President to the Board of Trustees was printed.

A Summer School was held for nine years ending in 1903, and in such years a Summer School Programme was issued.

In July, 1899, the University observed its tenth anniversary, and published the following volume:

Clark University, 1889-1899. Decennial Celebration. 8 x 11 in., pp. 566. Published for the University. Price, $5.00. Contains the lectures delivered by Professors Picard, Boltzmann, Ramon y Cajal, Mosso and Forel at the Decennial Celebration, July, 1899; also reports by the heads of departments on their aims and ideals, with a list of past and present members of the University and the titles of their published papers.

Proceedings of the Child Conference for Research and Welfare. Conferences held at Clark University in the summers of 1909 and 1910. Vol. 1, 1909, 257 p., contains 48 papers on problems relating to child welfare. Vol. 2, 1910, 287 p., contains 34 papers, on similar subjects. The papers in Vol. 1 were reprinted from the Pedagogical Seminary for September and December 1909, but those in Vol.

2, with one exception, have not been printed elsewhere. Price $2.00 per volume in paper, $2.50 in cloth. LOUIS N. WILSON, Publisher, Worcester, Mass.

In connection with the celebration of the 20th anniversary of Clark University in September, 1909, conferences and lectures were held by the several departments to which distinguished scientists and educators in this and other countries contributed. Two volumes of these lectures have been published with the titles:

Lectures and Addresses Delivered before the Departments of Psychology and Pedagogy in Celebration of the 20th Anniversary of the Opening of Clark University. 175+80 pages. Price, $2.00.

Lectures Delivered at the Celebration of the Twentieth Anniversary of the Foundation of Clark University under the Auspices of the Department of Physics. 161 pages. Price, $2.00.

JAPAN AND JAPANESE-AMERICAN RELATIONS, pp. xi, 348, New York: G. E. Stechert and Company, 1912, $2.50. Edited by Professor George H. Blakeslee. The volume contains twenty-two of the addresses delivered by the experts, both Japanese and American, who met at the Clark University Historical Conference, November, 1911. Each of the chapters deals with a distinct topic; together they cover progressively the field of what is both most interesting and most vital in the present national and international situation of Japan.

RECENT DEVELOPMENTS IN CHINA, pp. xi, 413, New York: G. E. Stechert and Company, 1913, $2.50. Edited by Professor George H. Blakeslee. These twenty-two addresses, given at the Clark University Conference, November, 1912, by Chinese and Americans who have a recent, intimate and authoritative knowledge of China, present the underlying causes of the Revolution, and the progress and

problems of the Chinese people in government, education, social welfare, industry and religion.

LATIN AMERICA, pp. xii, 388, New York: G. E. Stechert and Company, 1914, $2.50. Edited by Prof. George H. Blakeslee. Twenty-nine addresses given at the Clark University Conference, November, 1913.

These addresses, by well-known authorities upon Latin-American affairs, including a large proportion of citizens of Latin-American countries, present a critical study of the salient features of the life of the American Republics to the south of us, and of their relations to the United States. Among the topics especially emphasized are, the Monroe Doctrine, the Mexican Situation, Trade and Business Relations, Diplomatic Relations, and Education.

PROBLEMS AND LESSONS OF THE WAR. Clark University Addresses. Edited by Professor George H. Blakeslee. Foreword by President G. Stanley Hall. New York and London, G. P. Putnam's Sons, 1916, 424 pps. $2.00.

This volume contains side by side the opposing views on the fundamental issues of the war as presented by twenty-four writers of wide reputation. Three British subjects, one a member of Parliament, and three American citizens of German descent and sympathy—all university professors—are among the contributors. Some of the subjects discussed are: The Effect of the War Upon Europe, The German Theory of State, The German Theory of Militarism, What a German Victory Would Mean, The Effect of the War Upon Pan-American Coöperation, The Economic Position of the United States at the Close of the War, Naval Lessons to the United States in the War, The Maintenance of Our National Obligations, The Extension of the Monroe Doctrine, Economic Aspects of the War, Nationalism and War, The Red Cross Work, and Preparedness. President G. Stanley Hall discusses, in his foreword, The Psychology of the Present War.

JOURNALS CONNECTED UNOFFICIALLY WITH THE DEPARTMENTS

The American Journal of Psychology. This journal was commenced in November, 1887, and is now edited by G. Stanley Hall, E. C. Sanford, E. B. Titchener (Cornell University), and J. W. Baird, with the assistance of an international board of coöperators. Each volume contains four numbers—issued in January, April, July and October. Besides original articles, a considerable portion of its space is devoted to careful digests of the important literature in its field. Price, $5.00 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

The Pedagogical Seminary. This journal was begun in January, 1891, and is edited by the President of the University with the assistance of William H. Burnham, Professor of Pedagogy. It is an international record of educational literature, institutions and progress, and is devoted solely to the highest interest of education in all grades, with digests of important literature of all countries. It is the organ of the Educational Department of the University. Each volume contains four numbers—issued in March, June, September and December. Price, $5.00 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

The Journal of Race Development. This journal was begun in July, 1910, and is edited by Dr. Blakeslee and President Hall with the coöperation of a board of twenty-one contributing editors. It offers itself as a forum for the discussion of the problems which relate to the progress of races and states generally considered backward in their standard of civilization. Issued quarterly, each number containing about 125 pages. Price, $3.00 per volume; 75 cts. per number. Louis N. Wilson, Publisher, Worcester, Mass.

Journal of Applied Psychology. This journal will appear quarterly, beginning March, 1917. It is edited by President G. Stanley Hall and Drs. J. W. Baird and L. R. Geissler, with the coöperation of twenty contributing editors. It aims to be a medium for original investigations on the practical problems of psychology, and to digest the literature in its field through book reviews and summaries of articles appearing in other periodicals. Each volume of four issues will contain about 400 pages. Price, $4.00 per volume; single copies, $1.25. Florence Chandler, Publisher, Worcester, Mass.

UNIVERSITY COLORS

EMERALD GREEN AND WHITE

To be worn in the hood as a green chevron
on a white field

The Waverly Press
WILLIAMS & WILKINS COMPANY
BALTIMORE, U. S. A.

Clark University
in the City of Worcester
Massachusetts

Register and Thirty-second Official Announcement

1920

CLARK UNIVERSITY

WORCESTER, MASSACHUSETTS

REGISTER AND THIRTY-SECOND OFFICIAL ANNOUNCEMENT

WORCESTER, MASSACHUSETTS
Published for the University
April, 1920

BOARD OF TRUSTEES

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Francis H. Dewey
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Orlando W. Norcross

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† Died February 27, 1920
* Died August, 1919 ← Feb. 27, 1919

1920

JANUARY

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CALENDAR 1920–1921

1920			
Feb.	2	Monday	Founder's Day*
Feb.	23	Monday	Washington's Birthday
April	5	Monday	Spring Recess
April	10	Saturday	
April	19	Monday	Patriots' Day
May	31	Monday	Memorial Day
June	14	Monday	Thirty-first academic year closes

Summer Vacation

Sept.	23	Thursday	Thirty-second academic year begins
Oct.	12	Tuesday	Columbus Day
Nov.	25	Thursday	Thanksgiving Day
Dec.	24	Friday	Christmas Recess
1921			
Jan.	1	Saturday	
Feb.	1	Tuesday	Founder's Day*
Feb.	22	Tuesday	Washington's Birthday
April	4	Monday	Spring Recess
April	9	Saturday	
April	19	Tuesday	Patriots' Day
May	30	Monday	Memorial Day
June	20	Monday	Thirty-second academic year closes

***Not a holiday**

UNIVERSITY SENATE

GRANVILLE STANLEY HALL
WILLIAM EDWARD STORY
ARTHUR GORDON WEBSTER
HENRY TABER
WILLIAM HENRY BURNHAM
GEORGE HUBBARD BLAKESLEE
RALPH STAYNER LILLIE
CHARLES A. KRAUS
FRANK HAMILTON HANKINS
EDWIN GARRIGUEZ BORING

OTHER MEMBERS OF THE FACULTY

JOSEPH DE PEROTT
LOUIS N. WILSON
FRANK BLAIR WILLIAMS

UNIVERSITY STAFF

GRANVILLE STANLEY HALL, PH.D., LL.D. 156 Woodland St.
President of the University and Professor of Psychology

A.B., Williams College, 1867; A.M., 1870; Ph.D., Harvard University, 1878; Lecturer in Harvard and Williams Colleges, 1880–81; Professor of Psychology, Johns Hopkins University, 1881–88; President and Professor of Psychology, Clark University, 1888–; LL.D., University of Michigan, 1888, Williams College, 1889, and Johns Hopkins University, 1902; Chairman of the Library Committee and Curator of the Art Collection, Clark University. Member of the National Academy of Sciences; Resident Member of the Massachusetts Historical Society.

WILLIAM EDWARD STORY, PH.D. 17 Hammond St.
Professor of Mathematics and Secretary of the Faculty

A.B., Harvard University, 1871; Ph.D., University of Leipzig, 1875; Parker Fellow (Harvard), 1874–75; Tutor of Mathematics, Harvard University, 1875–76; Associate, Assistant Professor, and Associate Professor of Mathematics, Johns Hopkins University, 1876–89; Professor of Mathematics, Clark University, 1889–; Professor of Mathematics, Clark College, 1902–07; Member of the National Academy of Sciences; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

EDMUND CLARK SANFORD, PH.D., SC.D., LL.D.
Lecturer on College Administration 160 Woodland St.

A.B., University of California, 1883; Fellow in Psychology, Johns Hopkins University, 1887; Ph.D., 1888; Instructor in Psychology, 1888; Instructor in Psychology, Clark University, 1889–92; Assistant Professor, 1892–1900; Professor of Psychology, Clark College, 1903–07; Professor of Experimental and Comparative Psychology, Clark University, 1900–09; Lecturer on College Administration, 1909–; Sc.D., Hobart College, 1909; President of Clark College, 1909–; LL.D., University of California, 1912.

ARTHUR GORDON WEBSTER, PH.D., SC.D., LL.D.
Professor of Physics 66 West St.

A.B., Harvard University, 1885; Instructor in Mathematics, Harvard University, 1885–86; Parker Fellow, 1886–89; Student, Universities of Berlin, Paris, Stockholm, 1886–90; Ph.D., University of Berlin, 1890; Docent in Physics Clark University 1890–

92; Assistant Professor, 1892–1900; Professor, 1900–; Professor of Physics, Clark College, 1902–07; Director of Physical Laboratories; Sc.D., Tufts College, 1905; LL.D., Hobart College, 1908. Member of the National Academy of Sciences; Resident Fellow of the American Academy of Arts and Sciences; Member of the American Philosophical Society; Member of the Naval Consulting Board of the United States; Honorary Member of the Royal Institution of Great Britain.

HENRY TABER, PH.D.

Professor of Mathematics 26 Dayton St.

Ph.B., Yale University, 1882; Ph.D., Johns Hopkins University, 1888; Assistant in Mathematics, 1888–89; Docent in Mathematics, Clark University, 1889–92; Assistant Professor, 1892–1903; Professor, 1903–; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

WILLIAM HENRY BURNHAM, PH.D.

Professor of Pedagogy and School Hygiene 767 Main St.

A.B., Harvard University, 1882; Instructor in Wittenberg College, 1882–83; Instructor, State Normal School, Potsdam, N. Y., 1883–85; Fellow, Johns Hopkins University, 1885–86; Ph.D., 1888; Instructor in Psychology, 1888–89; Docent in Pedagogy, Clark University, 1890–92; Instructor, 1892–1900; Assistant Professor, 1900–06; Professor, 1906–.

GEORGE HUBBARD BLAKESLEE, PH.D. 21 Downing St.

Professor of History and International Relations

A.B., Wesleyan University, 1893; A.M., Harvard University, 1899; Ph.D., 1903; Student, Johns Hopkins University, 1893–94; Parker Fellow, Harvard, 1901–02; Student, Universities of Berlin, Leipzig, and Oxford, 1901–03; Instructor in History, Clark College, 1903–04; Assistant Professor, 1904–09; Professor, 1909–; Instructor in History, Clark University, 1905–11; Professor, 1911–; Member of the Council of the American Antiquarian Society; Resident Member of the Massachusetts Historical Society.

RALPH STAYNER LILLIE, PH.D.

Professor of Biology 2 Pleasant St.

A.B., University of Toronto, 1896; Student, University of Michigan, 1896–97; Fellow, University of Chicago, 1898–1901; Ph.D., 1901; Assistant in Physiology, Harvard University, 1901–02; Instructor, University of Nebraska, 1902–03; Adjunct Professor, 1903–04; Carnegie Research Assistant at Zoölogical Station, Naples, 1904–05; Instructor in Physiology, Harvard University, 1905–06; Johnston Scholar, Johns Hopkins University, 1906–07; Instructor in Physiological Zoölogy, University of Pennsylvania, 1907–12; Assistant Professor of Experimental Zoölogy, 1912–13; Instructor in General and Comparative Physiology, Marine Biological Laboratory, Woods Hole, Mass., 1902–; Professor of Biology, Clark University, October 1913–.

CHARLES A. KRAUS, PH.D.

Professor of Chemistry 11 Downing St.

B.S., University of Kansas, 1898; Fellow in Physics, Johns Hopkins University, 1899–1900; Research Fellow, Kansas University, 1900–01; Instructor in Physics, University of California, 1901–04; Research Assistant, Massachusetts Institute of Technology, 1904–08; Ph.D., 1908; Research Associate, 1908–12; Assistant Professor of Physical Chemical Research, 1912–14; Professor of Chemistry and Director of the Chemical Laboratories, Clark University, 1914–.

FRANK HAMILTON HANKINS, PH.D.
Professor of Sociology 4 Cabot St.

A.B., Baker University, 1901; Student in Sociology, Columbia University, 1903–04; Scholar, 1904–05; Fellow in Statistics, 1905–06; Student, 1907–08; Ph.D., 1908; Instructor in Economics, Clark College, 1906–07; Assistant Professor, 1908–13; Professor of Political and Social Science, 1913–; Instructor in Economics and Sociology, Clark University, 1906–07, 1908–15; Assistant Professor of Sociology, 1915–17; Professor, 1917–.

EDWIN GARRIGUES BORING, PH.D.
Professor of Experimental Psychology 11 Oberlin St.

M.E., Cornell University, 1908; A.M., 1912; Ph.D., 1914; Assistant in Psychology, 1911–13; Special Attendant, Government Hospital for the Insane, 1912; Instructor in Psychology, Cornell University, 1913–18; Professor of Experimental Psychology, Clark University, 1919–; Secretary of the American Psychological Association.

JOSEPH DE PEROTT
Lecturer in Mathematics 5 Hawthorn St.

Student, Universities of Paris and Berlin, 1877–80; Docent in Mathematics, Clark University, 1890–1904; Lecturer, 1904–.

LOUIS N. WILSON, LITT.D. 11 Shirley St.
Librarian of the University and Custodian of the Art Collection

Litt.D., Tufts College, 1905.

FRANK BLAIR WILLIAMS, PH.D.
Instructor in Mathematics 2 Isabella St.

C.E., University of Missouri, 1890; M. S., 1893; Engineering Work with the Mississippi River Commission, 1890–92; Teaching Fellow in Mathematics, University of Missouri, 1892–93; Survey Work with the Mississippi River Commission, 1894–95; United States Assistant Engineer in Tennessee River Improvement, 1895–97; Scholar in Mathematics, Clark University, 1897–98; Fellow, 1898–1900; Ph.D., 1900; Assistant Professor of Civil Engineering, Union College, 1900–05; Assistant Professor of Engineering and Mathematics, 1905–06; Professor of Engineering Mathematics, 1906–07; Assistant Professor of Mathematics, Clark College, 1907–08; Professor, 1908–; Honorary Fellow in Mathematics, Clark University, 1909–10; Instructor, 1910–; Fellow of the American Association for thn Advancement of Science; Member of the American Mathematical Society and of the Mathematical Association of America.

Archer Butler Hulbert, A.M.
Associate Professor of American History 7 Marston Way

A.B., Marietta College, 1895; A.M., 1904; Professor of American History, 1904–18; Graduate Student, Columbia University, 1910–1911; Harvard University, 1912–13; Archivist, Harvard Commission on Western History, 1912–17; Lecturer in American History, Clark College, 1918–; Clark University, 1918–19.

Samuel Weiller Fernberger, Ph.D. 767 Main St.
Assistant Professor of Experimental Psychology

B.S., University of Pennsylvania, 1908; M.A., 1909; Ph.D., 1912; Assistant in Psychology, 1908–09; Instructor, 1910–12; Instructor in Experimental Psychology, Clark University, 1912–15; Assistant Professor, 1915–.

Clyde Olin Fisher, Ph.D.
Lecturer in Economics 5 King St.

A.B., Trinity College (N. C.), 1911; A.M., Columbia University, 1916; Ph.D , Cornell University, 1919; Fellow in Economics and Finance, 1916–17; President White Fellow in Political and Social Sciences, 1917–18; Instructor in Economics, 1917–19; Assistant Professor of Economics, Clark College, 1919–.

Leland Hamilton Jenks, A.M.
Lecturer in History 6 Freeland St.

A.B., Ottawa University, 1913; A.M., University of Kansas, 1914; Fellow in European History, 1913–14; Scholar in History, Columbia University, 1915–16; Schiff Fellow in Political Science, 1916–17; Instructor in History, University of Minnesota, 1917–18; Cutting Traveling Fellow in Columbia University, 1919; Student in History, University of London, 1919; Assistant Professor of History, Clark College, 1919–.

Karl Johan Karlson, Ph.D.
Lecturer in Philosophy 56 Fairfax Rd.

A.B., Clark College, 1909; Scholar in Psychology, Clark University, 1909–10; A.M., 1910; Fellow, 1910–12; Ph.D., 1912; Honorary Fellow in Psychology, Clark University, 1912–14; Lecturer in Philosophy, 1914–.

James Pertice Porter
Lecturer in Psychology 209 Lovell St.

A.B., Indiana University, 1898; A.M., 1901; Instructor in Psychology, 1900–03; In charge of work in Neurology, Indiana University Biological Station, 1901 and 1903; Honorary Fellow in Psychology, Clark University, 1903–09; Ph.D., 1906; Instructor in Psychology, Clark College, 1903–07; Assistant Professor, 1907–12; Dean of the Faculty, 1909–; Lecturer in Psychology, Clark University, February–June, 1910; Instructor, 1910–12; Lecturer, 1915–; Professor of Psychology, Clark College, 1912–; Sc.D., Waynesburg College, 1917.

BENJAMIN SHORES MERIGOLD, PH.D.

Instructor in Chemistry 34 Chatham St.

A. B., Harvard University, 1896; A.M., 1897; Ph.D., 1901; Assistant in Chemistry, Harvard University, 1896–1900; Instructor in Chemistry, Worcester Polytechnic Institute, 1900–03; Assistant Professor of Chemistry, Clark College, 1903–08; Professor, 1908–; Instructor in Chemistry, Clark University, 1905–12, 1915–.

GEORGE FREDERIC WHITE, PH.D.

Instructor in Biological Chemistry 38 Somerset St.

S.B., Massachusetts Institute of Technology, 1906; Ph.D.. Johns Hopkins University, 1910; Assistant in Analytical and Organic Chemistry, Massachusetts Institute of Technology, 1906–08; Fellow, Johns Hopkins University, 1909–10; Associate Professor of Chemistry, Richmond College, 1910–12; Instructor in Organic Chemistry, Clark College, 1912–13; Assistant Professor, 1913–February 1918; Associate Professor, February 1918–; Docent in Biological Chemistry, Clark University, 1913–January 1915; Instructor, January 1915–.

LUDWIG REINHOLD GEISSLER, PH.D. 114 Woodland St.

Demonstrator in Experimental and Applied Psychology

B.Lit., University of Texas, 1905; Assistant in Psychology, Cornell University, 1905–09; Ph.D., 1909; Instructor in Psychology, 1909–11; Associate Professor of Psychology and Education, University of Georgia, 1912–16; Assistant Professor of Psychology and Education, Clark College, 1916–.

JAMES EDMUND IVES, PH.D. (Absent on leave)

Research Associate and Lecturer in Physics

Instructor in Physics, Drexel Institute, 1893–97; Student in Physics, Cavendish Laboratory, Cambridge, England, 1896; Scholar in Physics, Clark University, 1897–98; Fellow, 1898–1901; Ph.D., 1901; Instructor in Physics, University of Cincinnati, 1901–03; Assistant Professor, 1905–10; Associate Professor, 1910–12; Honorary Fellow in Physics, Clark University, 1912–16; Research Associate, 1916–17; Research Associate and Lecturer, 1918–; Resident Fellow of the American Academy of Arts and Sciences; Captain, U. S. Signal Corps, 1918–.

HONORARY FELLOWS AND ASSISTANTS

PHYLLIS MARY BLANCHARD, PH.D., Epping, New Hampshire

Research Assistant to President Hall 7 Hollywood St.

A.B., New Hampshire College, 1917; Scholar in Psychology, Clark University, 1917–18; A.M., 1918; Fellow, 1918–19; Ph.D., 1919.

LUCY DAY BORING, PH.D. 11 Oberlin St.

Honorary Fellow in Experimental Psychology

A.B., Mount Holyoke College, 1908; Ph.D., Cornell University, 1912; Assistant in Psychology, Mount Holyoke College, 1908–09; Assistant in Psychology, Cornell University, 1910; Assistant in Psychology, Vassar College, 1913–14; Instructor in Psychology, Wells College, 1914–15.

Irving Angell Field, Ph.D.
Honorary Fellow in Biology 19 Stoneland Rd.

B.S., Denison University, 1903; Instructor in Ornithology, 1902–03; Assistant in Zoölogy, Harvard University, 1903–05; Austin Teaching Fellow, 1905–06; Professor of Chemistry and Biology, Western Maryland College, 1906–11; A.M., Harvard University, 1912; Instructor in Biology, Clark College, 1911–13; Honorary Fellow in Biology, Clark University, 1911–; Ph.D., 1913; Assistant Professor of Biology, Clark College, 1913–16; Associate Professor, 1916–18; Professor, 1918–.

Robert Hutchings Goddard, Ph.D.
Honorary Fellow in Physics 5 Bishop Ave.

B.S., Worcester Polytechinic Institute, 1908; A.M., Clark University, 1910; Ph.D., 1911; Instructor in Physics, Worcester Polytechnic Institute, and Student in Physics, Clark University, 1908–09; Fellow, 1909–11; Honorary Fellow, 1911–12, 1914–15; Research Instructor in Physics, Princeton University, 1912–13; Instructor in Physics, Clark College, 1914–15; Assistant Professor, 1915–19; Associate Professor, 1919–; Instructor in Physics, Clark University, 1916–18; Honorary Fellow, 1918–.

Elmer Adna Harrington, Ph.D.
Research Assistant to Dr. Webster 46 May St.

A.B., Clark College, 1905; Scholar in Physics, Clark University, 1905–06; A.M. 1906; Fellow, 1906–07, 1908–09; Student in Physics, University of Berlin, 1907–08; Instructor in Physics, Williams College, 1909–12; Smith College, 1912–14; Fellow in, Physics, Clark University, 1914–15; Ph.D., 1915; Professor of Physics, University of North Carolina, 1915–16; Instructor in Physics, University of Michigan, 1916–17; Honorary Fellow in Physics, Clark University, 1918–19; Assistant Professor of Physics, Clark College, 1919–.

Carroll Cornelius Pratt, A.M.
Research Assistant to Dr. Boring 70 Florence St.

A.B., Clark College, 1915; Scholar in Psychology, Clark University, 1915–17; A.M., 1916; Student, University of Cambridge, February–July, 1919.

Frederick Haven Pratt, M.D.
Honorary Fellow in Biology 65 West St.

A.B., Harvard University, 1896; A.M., 1898; Student, University of Göttingen, 1899; Worcester Polytechnic Institute, 1900; Assistant in Physiology, Harvard Medical School, 1901; M.D., 1906; Instructor in Physiology, Boston Normal School of Gymnastics, 1907–09; Wellesley College, 1909–12; Professor of Physiology, University of Buffalo, 1912–19.

Kenneth Stillman Rice, Sc.M.
Honorary Fellow in Biology 21 Vincent Ave.

Ph.B., Brown University, 1913; Sc.M., 1915; Graduate Student in Physiology, 1915–17; Instructor in Physiology, Medical College of the University of Georgia, 1917–18; Instructor in Biology, Tufts Pre-Medical School, 1918–19; Assistant Professor of Biology, Clark College, 1919–.

LOUIS TEN EYCK THOMPSON, PH.D., Shrewsbury
Honorary Fellow in Physics

B.S., Kalamazoo College, 1914; Scholar in Physics, Clark University, 1914–15; A.M., 1915; Fellow, 1915–17; Ph.D., 1917; Research Assistant to Dr. Webster, 1916–18; Honorary Fellow, 1918–; Instructor in Mathematics and Physics, Clark College, 1917–18; Assistant Professor of Physics, 1918–19.

FELLOWS AND SCHOLARS

GEORGE BAIRD AFFLECK, M.P.E., Springfield
Fellow in Pedagogy 23 Maywood St.

A.B., University of Manitoba, 1897; B.P.E., International Y. M. C. A. College, Springfield, 1901; Director of Physical Education, Iowa State Teachers' College, 1901–06; Professor of Hygiene, International Y. M. C. A. College, Springfield, 1908–; M.P.E., 1909.

EMANUEL ANASTASSOFF, A.M., Kustendil, Bulgaria
Fellow in Pedagogy 27 Hollywood St.

Graduate, Normal School, Kustendil, Bulgaria, 1902; Pd.B., Valparaiso University 1909; A.M., Indiana University, 1910; Fellow in Pedagogy, Clark University, 1910–11; Professor of Psychology, Logic and Ethics, State Gimnasia for Boys, Philipopol, Bulgaria, 1912–13; Professor of Psychology and Pedagogy, State Normal School for Girls, Lovetch, Bulgaria, 1913–19; Fellow in Pedagogy, Clark University, September 1919–February 1920.

FRANK LEE BENNS, A.M. 74 Mason St.
American Antiquarian Society Fellow in History

A.B., Syracuse University, 1914; Assistant in History, 1916; A.M., 1916; Graduate student and Teaching-Fellow in History, 1916–Feb. 1918; Assistant in History Clark College, 1919–.

JOHN EDWARD BENTLEY, A.M., Dedham
Fellow in Psychology

Graduate, Wesleyan Theological College, Montreal, 1915; Student in Psychology, Clark University, 1915–16; A.M., 1916; S.T.B., Boston University, 1917; Boston University Graduate School, 1917–18; Fellow in Psychology, Clark University, 1918–.

CHARLES BIRD, A.M.
Fellow in Psychology 766 Main St.

B.H., International Y. M. C. A. College, Springfield, 1916; Scholar in Psychology, Clark University, 1916–17; A.M., 1917; Fellow, 1917–18.

THOMAS ISAACS BROWN, A.M., Atlanta, Georgia
Fellow in Sociology 45 John St.

A.B., Clark College, 1913; Scholar in Economics, Clark University, 1913–14; A.M., 1914; Professor of History and Economics, Philander Smith College, 1914–16; Professor of History and Economics, Atlanta University, 1916–; Assistant in Sociology, Clark College, 1919–.

Chung Yen Chiu, A.M., Chekiang, China
Fellow in Chemistry 766 Main St.

A.B., University of California, 1915; Student, Massachusetts Institute of Technology, 1915–16; Scholar in Chemistry, Clark University, 1916–17; A.M., 1917; Fellow, 1917–; Assistant in Chemistry, Clark College, 1918–19.

Mary Elizabeth Collett, Ph.D., Atchison, Kansas
Fellow in Biology 13 Gates St.

A.B., Wellesley College, 1910; Scholar in Zoology. University of Pennsylvania, 1910–11; A.M., 1911; Graduate Assistant in Biology, Brown University, 1911–12; Instructor in Biology, Carnegie Institute of Technology, 1912–17; Moore Fellow in Zoölogy, University of Pennsylvania, 1917–18; Pepper Fellow, 1918–19; Ph.D., 1919.

Leland Whitney Crafts, B.S., Newfields, New Hampshire
Fellow in Psychology 6 Wyman St.

B.S., New Hampshire College, 1915; Research Assistant, Vineland Training School, 1915–16; Instructor in English and German, New Hampshire College, 1916–17.

Frank Harold Ellsworth, A.M.
Fellow in Chemistry 117 Lincoln St.

A.B., Clark College, 1916; Scholar in Chemistry, Clark University, 1916–17; A.M. 1917.

Henry Douglas Fryer, A.M., Willimantic, Connecticut
Fellow in Sociology 57 May St.

B.H., International Y. M. C. A. College, Springfield, 1914; Scholar in Psychology, Clark University, 1916–17; A.M., 1917; Fellow in Sociology, October, 1919–February, 1920.

Roy Reno Hewitt, Ph.B., Salem, Oregon
Fellow in Sociology 11 Preston St.

Ph.B., Willamette University, 1909; LL.B., Willamette College of Law, 1909; Lecturer on Elementary Law, Clark College, 1919–.

Yü, Tinn Hugh, A.M., Canton, China
Fellow in Sociology 766 Main St.

LL.B., Valparaiso University, 1915; Pd.B., 1917; A.B., University of Maine, 1917; Scholar in Sociology, Clark University, 1917–18; A.M., 1918.

Charles Buell Hurd, M.S., New Britain, Connecticut
Fellow in Chemistry 23 Dover St.

B.S. Worcester Polytechnic Institute, 1915; Graduate Instructor in Chemistry, 1915–17; M.S., 1917; Instructor in General Chemistry, 1917–18; Instructor in Theoretical Chemistry, 1918–.

WALTER WILLIAM LUCASSE, A.B., Kalamazoo, Michigan
Fellow in Chemistry 4 Hammond St.

A.B., Kalamazoo College, 1917; Assistant in Chemistry, Clark College, 1917–18; Scholar in Chemistry, Clark University, September 1917–February 1918; January–June, 1919.

KELLY MILLER, JR., A.M., Washington, District of Columbia
Fellow in Physics 21 Bancroft St.

B.S., Howard University, 1916; Scholar in Physics, Clark University, 1916–17; A.M., 1917; Fellow in Physics, 1917–18, September 1919–February 1920.

HENRY COLE PARKER, A.M., Highland, California
Fellow in Chemistry 9½ Hancock St.

B.S., Kalamazoo College, 1915; Scholar in Chemistry, Clark University, 1915-16; A.M., 1916; Fellow, 1916-17, January 1919–.

MAURICE E. J. PIETERS, A.M., Brussels, Belgium
Fellow in Pedagogy 70 Florence St.

Graduate, École Normale de Bruxelles, 1912; Student, University of Paris, 1916–17; Fellow in Pedagogy, Clark University, 1917-; A.M , 1918.

SAMUEL ERNEST POND, A.M., Woonsocket, Rhode Island
Fellow in Biology 13 Isabella St.

B.H., International Y. M. C. A. College, Springfield, 1912; Fellow in Biology, Clark University, 1915–Jan. 12, 1918; A.M., 1917; Instructor in Biology, Western Reserve University, 1918–19.

CHARLES PINCKNEY POOLE, A.B., Nashville, Tennessee
Fellow in Psychology 23 Maywood St.

A.B., Lipscomb College, 1918; Graduate Student, Texas Christian University, Jan.–June 1919.

CLARA EVE SCHIEBER, A.M., Bucyrus, Ohio
Fellow in History 9 Hawthorn St.

B.S. in E., Ohio University, 1916; Scholar in History, Clark University, 1917-18; A.M., 1918.

LORINE LIVINGSTON PRUETTE, B.S., Chattanooga, Tennessee
Fellow in Sociology 46 May St.

B.S., University of Chattanooga, 1918.

FRANCIS CECIL SUMNER, A.M., Washington, District of Columbia
Fellow in Psychology 50 King St.

A.B.. Lincoln Univeristy, 1915; A.B., Clark College, 1916; Instructor in German and Psychology, Lincoln University, 1916–17; A.M., 1917; Fellow in Psychology, 1917–18.

ELIZABETH BRETT WHITE, A.M., Gettysburg, Pennsylvania
Fellow in History 41 May St.

A.B., Cornell University, 1904; Instructor in History, Pennsylvania College for Women, 1912–; A.M., University of Wisconsin, 1917.

MATSUSABURO YOKOYAMA, A.M., Mito, Japan
Fellow in Experimental Psychology 15 Birch St.

Assistant in Psychology, Colorado College, 1916–17; A.B., 1917; University Scholar in Philosophy, Harvard University, 1917–18; A.M., 1918; Fellow in Psychology, Clark University, 1918–19.

EDWARD ZEITFUCHS, M.S., Berkeley, California
Fellow in Chemistry 12 Oberlin St.

B.S., University of California 1912; M.S., Massachusetts Institute of Technology, 1918; Research Assistant in Physical Chemistry, 1917–18; Research Assistant to Dr. Kraus, Clark University, 1918–19.

EARL FREDERICK ZINN, B.H., Springfield
Fellow in Psychology 5 King St.

B.H., International Y. M. C. A. College, Springfield, 1916; Acting Professor of Religious Education, 1916–18.

CARLETON DEANE HAIGIS, B.S., Shrewsbury
Honorary Scholar in Mathematics

B.S., Worcester Polytechnic Institute, 1915; Instructor in Physics, 1915–; Scholar in Physics, Clark University, 1916–17.

CARL DAVID JOHNSON, A.B.
Honorary Scholar in Mathematics 1 Webster St.

A.B., Clark College, 1915; Assistant in Physics and Physical Training, 1915–16; Assistant in Physics, 1916–19; Scholar in Physics, Clark University, 1915–19; Instructor in Physics, Worcester Polytechnic Institute, 1919–.

WILLARD LOUIS OSBORN, A.B.
Honorary Scholar in Mathematics 9 Ferdinand St.

A.B., Clark College, 1906; Instructor in Mathematics and Physics, Hobart College, 1910–14; Fellow in Mathematics, Clark University, 1914–15; Honorary Scholar in Mathematics, 1917–.

CHARLES SCOTT PORTER, A.B., Northampton
Honorary Scholar in Mathematics 62 Wachusett St.

A.B., Amherst College, 1919; Instructor in Mathematics, Worcester Polytechnic Institute, 1919–.

JOHN HENRY ALSTON, A.B., Baltimore, Maryland
Scholar in Experimental Psychology 21 Bancroft St.

A.B., Lincoln University, 1917; Instructor in Mathematics, Walden University, 1917–18.

ADDIE CLONTS ARNOLD, Fort Worth, Texas
Scholar in Psychology 16 May St.

Graduate, Southwestern Baptist Theological Seminary, 1915.

WILLIAM ANDREW ARNOLD, A.M., Fort Worth, Texas
Scholar in Psychology 16 May St.

Th.G., Southwestern Baptist Theological Seminary, 1910; A.B., Texas Christian University, 1919; A.M., 1919; Instructor in Physics, Baylor University, 1904–07.

MOSELLE ASHFORD, A.B., Athens, Georgia
Scholar in Philosophy 9 Hawthorn St.

A.B., Florida State College for Women, 1919.

MARJORY BATES, A.B., Waterville, Maine
Scholar in Psychology 52 May St.

A.B., Smith College, 1917; Interne in Psychology, Boston Psychopathic Hospital, 1919.

JOHN EDWARD BRIERLY, A.M.
Scholar in History 34½ Douglas St.

A.B., Clark College, 1916; Assistant in History, 1916–18; Scholar in History, Clark University, 1916–17; A.M., 1917; Fellow in History, 1917–18.

WILLIAM BUGDENOVICH, A.B., Leicester
Scholar in Chemistry

A.B., Clark College, 1919; Scholar in Chemistry, Clark University, September 1919–January 1920.

WINTHROP MELVIN BURKE, A.B., Portsmouth, New Hampshire
Scholar in Chemistry 12 Oberlin St.

A.B., Clark College, 1918.

CONRAL CLEO CALLIS, A.B., Sebree, Kentucky 16 Tirrell St.
Scholar in Chemistry and Assistant to Dr. Kraus

A.B., Clark College, 1918.

LEON WALTER COOK, A.B., Natick
Scholar in Chemistry 28 Hollywood St.

A.B., Clark College, 1918; Scholar in Chemistry, Clark University, January 1919–February 1920.

EUSTACE CUY (Couyumdjopoulos), A.B., Beni-Suef, Egypt
Scholar in Chemistry 84 Woodland St.

A.B., Kalamazoo College, 1918; Scholar in Chemistry, Clark University, 1918–; Assistant in Chemistry, Clark College, 1919–.

Adolph Gustavus Ekdahl, A.B., Nashua, New Hampshire
Scholar in Psychology 67 Windsor St.

D.M.D., Tufts Dental College, 1912; A.B., Clark College, 1919; Assistant in Psychology, 1919–.

Albert Farnsworth, Ph.B.
Scholar in History 48 Beaconsfield Rd.

Ph.B., Brown University, 1910; Scholar in History. 1918–.

Edward Franklin Frazier, A.B., Baltimore, Maryland
Scholar in Sociology 21 Bancroft St.

A.B., Howard University, 1916.

Dorothy Hanson, A.B., Franklin, New Hampshire
Scholar in Psychology 7 Hollywood St.

A.B., New Hampshire State College, 1919.

Clarence Nichols Hickman, A.M., New Albany, Indiana
Scholar in Physics 39 King St.

A.B., Winona College, 1914; Scholar in Physics, Clark University, 1917–18; A.M. 1918.

William Conrad Himmer, A.B., Lawrence
Scholar in History 31 William St.

A.B., Harvard University, 1917; Instructor in Modern Languages, Worcester Polytechnic Institute, 1918–.

Albert Thomas Huizinga, B.S., Chicago, Illinois
Scholar in Chemistry 3 Lowell St.

B.S., Kalamazoo College, 1919; Graduate Student in Chemistry, University of Chicago, Summer Quarter, 1919; Assistant in Chemistry, Clark College, and Scholar in Chemistry, Clark University, September, 1919–April, 1920.

Herman Fletcher Kurtz, A.B., Kalamazoo, Michigan
Scholar in Chemistry 3 Lowell St.

A.B., Kalamazoo College, 1918; Assistant in Chemistry, Clark College, 1918–; Scholar in Chemistry, Clark University, 1918–.

Chi Li, A.B., Peking, China
Scholar in Sociology 766 Main St.

A.B., Clark College, 1919.

Ellen Augusta Maher
Scholar in Pedagogy 766 Pleasant St.

Graduate, Worcester State Normal School. 1912; Student in Experimental Psychology, Clark University, 1916–18; Scholar in Pedagogy, Clark University, 1918–

Montagu Frank Modder, B.H.
Scholar in Sociology 766 Main St.

A.B., Royal College, Colombo, Ceylon, 1913; B.H., International Y. M. C. A. College, Springfield, 1916.

Mable Thurston Murray, A.M., Holliston
Scholar in History

Pd.B., University of Maine, 1917; Scholar in History Clark University, 1917–18; A.M., 1918; Fellow in History, 1918–19.

Ernest William Nelson, A.B., Brockton
Scholar in History 20 Beeching St.

A.B., Clark College, 1916.

Juichiro Okada, Tokyo, Japan
Scholar in Physics 15 Hammond St.

Graduate, Artillery and Engineering College, Tokyo, 1916.

Emelyn Newcomb Partridge
Scholar in Psychology 6 Charlotte St.

Student in Anthropology, Clark University, 1913–14; Student in Peadgogy, 1914–15; Honorary Scholar in Sociology, 1918–19.

Effie Doane Pettit, A.M., Waldo, Florida
Scholar in Pedagogy 70 Maywood St.

A.B., Florida State College for Women, 1909; A.M., 1912; Scholar in Pedagogy, Clark University, 1913–14.

John Edward Ratigan, A.B.
Scholar in Chemistry 10 Lucian St.

A.B., Holy Cross College, 1919.

Murray John Rice, B.S., Flint, Michigan
Scholar in Chemistry 4 Hammond St.

B.S., Kalamazoo College, 1919.

Burgess B. Ross, South Lancaster
Scholar in History

MICHAEL FRANCIS ROUSE, A.M.
Scholar in Mathematics — 60 Temple St.

B.S., Villanova College, 1895; A.M., 1914; Scholar in Mathematics, Clark University, 1918–.

LAURA GERTRUDE SMITH, A.M.
Scholar in Sociology — 466 Pleasant St.

Litt.B., Boston University, 1910; Student in Pedagogy, Clark University, 1916–19; A.M., 1919.

SEWARD CHARLE STALEY, B.P.E., Johnstown, New York
Scholar in Pedagogy — 2 Woodbine St.

B.P.E., International Y. M. C. A. College, Springfield, 1917; Assistant in Physical Training, Clark College, 1919–.

JOHN WILLIAM SULLIVAN, A.B., Thorndike
Scholar in Chemistry

A.B., Clark College, 1919; Scholar in Chemistry, Clark University, September–December, 1919.

OTHER REGULAR STUDENTS

HELEN MAHER DOWNEY, A.M.
Student in History — 288 Pleasant St.

A.B, Wellesley College, 1908; Scholar in Pedagogy, Clark University, 1908–09; A.M., 1909; Student in Sociology, September 25–December 20, 1918.

JOHN JOSEPH DROHAN
Student in Pedagogy — 11 Ormond St.

Graduate, Worcester State Normal School, 1917.

ALBERT SCOTT HAWKES, S.T.M.
Student in Psychology — 387 May St.

A.B., Oberlin College, 1893; B.D., Hartford Theological Seminary, 1900; S.T.M., 1910.

FREDERICA FEITSHANS KRAUS, A.B.
Student in Biology — 11 Downing St.

A.B., Kansas University, 1902; Student in Biology, Clark University, 1915–.

ALEXANDER BENJAMIN MACLEOD, Leicester
Student in Psychology

Student, Boston University, 1900–03; Student in Psychology, Clark University, 1918–.

Ellen Josephine O'Leary
Student in Sociology 98 Hamilton St.

Graduate, Worcester State Normal School, 1912; Student in Experimental Psychology, Clark University, 1916–18.

John Burke O'Leary, A.B.
Student in Sociology 98 Hamilton St.

A.B., Holy Cross College, 1915.

Harry Rupert Stevens, B.S., Grafton
Student in Pedagogy

B.S., Dartmouth College, 1911.

George Allen Coe, A.M., Grafton
Student in Psychology

B.H., International Y. M. C. A. College, Springfield, Mass., 1909; Instructor in English, 1908–09; Scholar in Pedagogy, Clark University, 1913–14; A.M., 1914; Student in Psychology, 1918–February, 1920; Scholar, February, 1920–.

SPECIAL STUDENTS

Lawrence A. Averill	Psychology
Walter E. Barnard	Psychology and Pedagogy
M. Harriette Bishop	Psychology
Ethel S. Burton	History
Harry J. Cahill	Psychology and Pedagogy
George B. Clarke	Psychology
Florence P. Coe	Sociology
Oliver R. Cook	Sociology
Edith M. Dixon	Psychology
Maud A. Dodge	Sociology
Mary R. Drury	History
Sarah L. Gould	Psychology
Virginia M. Keyes	Sociology
Lillian I. King	Pedagogy
Robert E. Lamb	Psychology
Elizabeth M. Lincoln	Psychology
John I. Lusk	Psychology and Pedagogy
Sarah A. Marble	Psychology and Pedagogy
Nina A. Mason	History
Harry E. Milliken	Psychology
John E. Murray	Psychology and Pedagogy

Anna W. Newell	Psychology
Delia G. O'Connor	Psychology and Pedagogy
Lucy A. Osborne	Psychology
Harriet R. Pierce	Psychology
Edward H. Snow	Psychology and Pedagogy
G. Hazel Swan	Psychology and Pedagogy
Miriam Titcomb	History
Emma Forbes Waite	Pedagogy
Gertrude E. Williams	Sociology

Florence Chandler 938 Main St.
Bursar, and Clerk of the University

Mabel Soderberg 5 Hooper St.
Assistant in the Bursar's office

Mary Margaret McLoughlin, S.B. 110 Vernon St.
Private Secretary to the President

ADMINISTRATION

The trustees are the ultimate source of authority in all matters pertaining to the University. They act collectively, through committees, and also through the President of the University.

Duties of the President of the University

The duties of this office were defined by the Trustees May 23, 1889, as follows:

The President of the University shall consult frequently with the Trustees on all matters that concern the welfare of the University, and attend the meetings of the Board. He shall confer with each instructor concerning the development of his department, determine the duties and authority of each, and preside at the meetings of the Faculty. He shall be the authorized medium of communication between the Board of Trustees and the officers of instruction, individually and collectively, in all matters involving the administration of the University. The enactments of the Board concerning instructors and their work, and all requests, complaints and proposals from the Faculty to the Trustees shall be made known through him. He shall exercise or provide such superintendence over buildings, apparatus, books and other property, as will secure their protection and appropriate use. Expenditures must not be ordered by any instructor of the University without his previous consent or the express authority of the Board.

These duties were more fully defined by By-Laws enacted by the Corporation, Sept. 26, 1889. These are as follows:

BY-LAWS

1. The President of the University shall preside on all public academic occasions, shall direct the official correspondence, study the wants and interests of the whole University and exercise a general superintendence over all its concerns. His first care, and that of the authorities of the University, shall be the departments already established, and next those closely related to them; but no other department shall be established until those already introduced have been brought to the highest state of efficiency then possible. All acts, however, which shall involve the expenditure of money in the administration of the University's affairs, shall be subject to the approval of the Board of Trustees or the Finance Committee for the time being.

2. As the efficiency of a University depends chiefly upon the quality of its Faculty, the Board of Trustees will hold the President to a strict but reasonable accountability for the fidelity and ability of each instructor. The President only shall have the power to select and appoint all officers of instruction, subject to the approval of the Board of Trustees. To make wise and well-considered appointments, to maintain harmony within the Faculty, and to increase their efficiency in research and instruction shall be his most important duty. If at any time the President shall be negligent in the discharge of these or other duties, or is from any cause disabled from discharging them, they may be exercised by the Board of Trustees.

3. The President of the University shall be the medium of communication between the Trustees and Instructors, individually and collectively, upon all matters within the field of

action of either body. He shall attend all meetings of the Board of Trustees, of which he shall be notified, and shall participate in their deliberations, but without the power to vote. All complaints and requests from members of one body to the other shall be made through him.

4. The President shall call and preside over all official meetings of the Instructors, and a record of their proceedings shall be kept. These records are in no case to be made known to others than the Trustees. They shall always be in the custody of the President, but may be inspected by the Trustees, or either of them, at any time.

5. The President of the University, in the absence of the Trustees or Finance Committee, shall have the entire direction and control of the persons employed about the University and not engaged in the work of instruction; the duties of all such persons shall be assigned and they shall be appointed or removed by him, subject to the approval of the Finance Committee.

6. No instructor shall order any books or apparatus, or anything connected with the work of instruction (beyond his appropriation), without the approval of the President. No expense for the care of buildings or grounds, nor for alterations or repairs within and upon the same shall be made without the approval of the Board of Trustees or the Finance Committee, such alterations or repairs in no case to exceed the appropriations made for that purpose. If the Trustees, or Finance Committee,or any person, shall make contracts in behalf of the University without authority, the officer or person making such contract shall become individually responsible therefor.

7. The officers of instruction shall be appointed for a term of from one to five years. At the end of this period the work of each instructor will be subjected to a careful scrutiny upon the results of which his reappointment shall depend, always provided, however, that any Instructor will be liable to be dis-

charged at any time for incapacity, neglect of duty or for such other cause as shall seem good to the Trustees.

8. Each Instructor shall give stated lectures to however few. He shall actively and zealously strive to maintain the highest possible standard, shall work in a spirit of hearty sympathy and coöperation, and shall encourage research by precept and, if possible, by example.

9. The foregoing By-Laws are intended to embody the provisions contained in a vote passed by the corporation on the twenty-third day of May, A.D. 1889, upon the motion of Judge Devens. (See above.) If at any time hereafter any discrepancy shall be found to exist between the two, said By-Laws shall be so far modified as to conform to the provisions of said vote.

10. No instructor shall engage in any outside professional or technical pursuit without the approval of the Board, the Finance Committee, or the President.

11. These By-Laws, or any one of them, may be changed, amended, or repealed by a vote of three-fourths at least of the Trustees at any meeting of their Board duly called, notified, and held for that purpose.

GENERAL STATEMENTS

The University now consists of eight departments, in which all its work and that of Instructors, Fellows and Scholars is grouped.

These departments are as follows:

I. MATHEMATICS
II. PHYSICS
III. CHEMISTRY
IV. BIOLOGY
V. PSYCHOLOGY
VI. PEDAGOGY
VII. SOCIOLOGY
VIII. HISTORY

THE FACULTY

The University Senate shall consist of the President and the full professors in the University.

They shall determine the general policy of the University in matters pertaining to instruction and research, formulate the requirements for the Master's and Doctor's degrees, recommend candidates for these and for all honorary degrees,—such degrees not to be bestowed without their approval.

The Senate shall also approve all appointments to the teaching staff for a term of more than one year, and also all promotions on that staff. They shall act and advise in other matters submitted to them.

The General Faculty shall consist of the President and all members of the regular teaching staff of the University. They shall appoint scholars and fellows and consider all other matters pertaining to the interests of the University that may be officially submitted to them.

ADMISSION

Only graduate students or those of equivalent attainments are admitted to full membership in the University, except in rare and special cases.

At present no entrance examinations are required; but by testimonials, diplomas, personal interviews, or written specimens of work, the authorities must be satisfied that the applicants have scholarship enough to work to advantage, and zeal and ability enough to devote themselves to their chosen field. The methods of the University are too costly, and its energy and funds too precious, to be spent upon those who are not well trained, promising and in earnest.

It is highly desirable that candidates entering any of the eight departments shall have, beside a knowledge of the other subjects commonly taught in colleges, a reading knowledge of French and German.

For the select students who are received, it is the purpose of the University to open all its privileges and to supply every incentive possible in the way of books, facilities, and, above all, direct personal stimulus. The chief as well as the best work of this University is individual and involves daily suggestion, encouragement and direction. The limited number of students permits more or less personal instruction in each case.

CLASSES OF APPOINTEES

No clearly marked line exists between students and instructors. Fellows who have attained some degree of mastery in a special line of work sometimes give brief special courses, which may be attended by professors.

This is a stimulus to the student, and both tests and exhibits power in teaching.

I. DOCENTS

The highest residential appointment not involving membership in the Faculty is that of Docent. These positions are designed for men of marked gifts and attainments who have at least attained the doctorate and wish to engage in research, teaching, or both.

Class A. Free Docents

Each docent of this class will be expected to deliver a limited number of lectures on some topic within his department. In so doing, he shall be entirely independent of other instructors both in his choice of a special topic and his manner of treating it, and responsible only to the President of the University, by whom he shall be appointed after consultation with the head of the department. The free docent shall have command of the resources of the department in the way of books, apparatus, etc., so far as this does not interfere with its regular work. By establishing free docents, the Faculty desires not only to maintain and guarantee the fullest academic freedom, but to expose itself to all the stimulus that can come by the rivalry of younger or outside men, and to introduce new topics and new departures in old ones.

Class B. University Docents

A University docent shall engage in research and may collaborate with the head of the department or other

member of the Faculty and supplement his work. He shall be appointed by the head of the department with the approval of the President.

Habilitation of Docents

A docent of either class may prepare and read in public an habilitation address representing original work after a term of service of a length and under conditions to be determined by the Faculty for each individual case. Upon doing this, he may be formally presented with a certificate or diploma granting him the *venia docendi* or licentiate, which shall not be a title or degree, but shall attest his fitness as scholar or investigator for an academic position and shall be regarded by the University as a brevet collegiate professorship. The fee for such a certificate shall be $25, which the Faculty shall have power to remit. The compensation of a docent of either class, if any, shall be determined by the President, and the fees to be paid him by students, if any, shall be determined by the Bursar.

It is believed that the difficulties of college authorities in selecting suitable professors may be somewhat diminished by the existence of such a select body of scholars of guaranteed scientific training, ability, and approved power to teach, and that this new grade may aid in raising the standard of academic scholarship.

II. QUIZ MASTERS

Each member of the University Faculty may, with the approval of the President, appoint one or more quiz masters who with the aid of his lecture notes, or

otherwise, shall conduct review classes upon his lectures and who may hold preliminary tests, but who shall not lecture or give instruction save as review. These positions shall be regarded as honorary and as a privilege of more advanced students in perfecting their own knowledge and acquiring practice in instruction.

III. NON-RESIDENT LECTURERS

The representatives of each department may, with the approval of the President, bring eminent experts for exchange or other lectures of a special nature at any time during the academic year. They may also in return, with the approval of the President, give similar brief courses in other institutions, provided this does not interfere with their full efficiency for the work of this University.

IV. HONORARY FELLOWS

Those who have already advanced to the Doctor's degree may be appointed Honorary Fellows and given the privileges of the University, including those of the Library. In past years many who have already taken this degree, either in this country or abroad, and who are awaiting academic appointment, have found these positions both helpful for their own further research and development and also advantageous for obtaining the collegiate and university appointments that they seek.

V. CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Candidates for the Doctor's degree must have previously taken the Degree of Bachelor of Arts or have had

a substantial equivalent for the training implied by that degree.

At least one year, but in most cases three years, of graduate work are necessary for this degree. Examinations for it, however, may be taken at any time during the academic year when, in the judgment of the University authorities, the candidate is prepared, provided the requirement of one year's residence has been absolved.

For this degree one requirement is a dissertation upon an approved subject, to which it must be an original contribution of value. To this capital importance is attached. It must be reported on in writing by the chief instructor before the examination, printed at the expense of the candidate, and at least one hundred copies given to the University. However, in case of a dissertation of unusual length, or containing expensive plates, the Senate shall have power, at the request of the candidate, to reduce this number of presentation copies to fifty.

Such formal or informal tests as the Faculty may determine shall mark the acceptance of each student or Fellow as a candidate for this degree. One object of this preliminary test shall be to insure a good reading knowledge of French and German. Such formal candidature shall precede the examination itself by a period prescribed in the special rules below.

The fee for the Doctor's degree is $25, payable before the examination. The presentation copies of the dissertation must be in the hands of the Librarian before the diploma is delivered. In exceptional cases, and by special action of the Faculty, the act of promotion may precede the presentation of the printed copies of the dissertation.

An oral, but no written, examination is required upon at least one minor subject in addition to the major before an examining jury composed of at least four members, including the head of the department and the President of the University, who is authorized to invite any person from within or without the University to be present and to ask questions. The jury shall report the results of the examination to the Senate, who will recommend satisfactory candidates for the degree.

For the bestowal of this degree, the approbation of the Board of Trustees must in each case be obtained by their signature upon the diploma. They desire that the standard of requirements for it be kept the highest practicable, that it be reserved for those of superior ability and attainment only, and that its value be never suffered to depreciate.

It is to the needs of candidates for this degree that the lectures, seminaries, laboratories, collections of books, apparatus, etc., are especially shaped, and no pains will be spared to afford them every needed stimulus and opportunity. It is for them that the Fellowships and Scholarships are primarily intended, although any of these honors may be awarded to others.

On November 14th, 1900, the following vote was passed by the Board of Trustees:

That the University will admit candidates for the degree of Doctor of Philosophy and will confer that degree without regard to sex.

Special Rules concerning the Doctor's Degree

I. *Residence.* No candidate shall receive the degree of Doctor of Philosophy without at least one academic year's previous residence.

II. *Candidature for the Doctor's Degree.* Every applicant for the Doctor's degree shall fill out, before October fifteenth, the regular application blank provided at the office. This schedule shall be submitted to the head of the department. Before affixing his signature he shall satisfy himself, in such manner as he may desire, as to the fitness of the applicant.

III. When countersigned, this schedule shall be filed with the President, and the applicant will be examined in French and German by the annual committee for that purpose.

IV. In case of a favorable report by this committee, the applicant shall be a regular candidate for the degree.

V. Candidates complying with all preliminary conditions, including the examinations in French and German, before November first will be allowed to proceed to the doctor's examination at any time between May fifteenth following and the end of the academic year.

VI. *The Doctor's Dissertation.* The dissertation must be presented to the instructor under whose direction it is written, and reported upon by him before the doctor's examination. In every case the dissertation shall be laid before the jury of examination, at the time of examination, in form suitable for publication; although this provision shall not preclude the making of such minor changes later as the chief instructor may approve. This copy of the dissertion shall be deposited in the library, not to be taken out until the final form is substituted.

VII. The dissertation shall be printed at the expense of the candidate and the required copies deposited with the Librarian within one calendar year after the first of

October following the examination. The candidate alone will be held responsible for the fulfilment of these conditions.

VIII. The favorable report of the chief instructor filed in writing with the Clerk of the University, shall be a sufficient imprimatur or authorization for printing as a dissertation. The printed copies shall bear upon the cover and title page the statement of approval in the following words, over the signature of the chief instructor:

> A Dissertation submitted to the Faculty of Clark University, Worcester, Mass., in partial fulfilment of the requirements for the degree of Doctor of Philosophy, and accepted on the recommendation of
>
> (NAME OF CHIEF INSTRUCTOR).

IX. *Examinations for the Doctor's Degree.* The examinations for the doctor's degree may be held at any time during the academic year, provided that at least one academic year has elapsed since the completion of the preliminaries of candidature, except in the case of fulfilment of these conditions between the beginning of any academic year and November first of that year, to which case Rule V applies. The examinations shall be held at such hours and places as the President may appoint.

X. Examinations may also be held during the regular vacations of the University, but for these an additional fee of five dollars to each examiner and the reasonable travelling expenses of any examiners who are out of town, all payable in advance, will be required.

VI. CANDIDATES FOR THE DEGREE OF MASTER OF ARTS

This degree is conferred upon candidates who comply with the following requirements:

1. The candidate shall have previously taken the degree of Bachelor of Arts, or have had a substantial equivalent for the training implied by that degree, to be determined by special vote of the Senate; but such degree or training must involve a good preparation for the work proposed for the Master's degree, in order that it may be accepted.

2. The candidate must devote a full academic year to post-graduate work in this University after receiving the Bachelor's degree or the training accepted as its equivalent. This work shall be mainly in one department, but the candidate may do also such other work as shall be advised by the head of his principal department —whose approval of the whole course shall be necessary. In particular cases, the candidate may be allowed, by special vote of the Senate, to divide his work between two years; but the aggregate must, in all cases, amount to a full year's work, at least.

3. The candidate must satisfy the representatives of his principal department that he has done his work faithfully and has mastered the subjects involved, by such written and oral examinations and other tests as the department may require. The head of the department shall make a written report to the Senate of the grounds on which the candidate is recommended, specifying the amount and character of his work, and this report shall be filed in the office.

4. The candidate must present a thesis or written report on some topic included in his course or closely related to it, that shall receive the approval of the representatives of his principal department, be accepted by the Senate, and filed in the office.

5. Every candidate recommended for the Master's degree shall pay a fee of ten dollars.

6. The Master's degree will be conferred at the annual commencement in June of any year on those candidates only who shall have made written application to be considered as such on or before January 15th preceding and shall have fulfilled all the conditions here specified at least one week before Commencement, at which time the academic year shall be regarded as ending for the purposes of section 2.

VII. SPECIAL STUDENTS NOT CANDIDATES FOR A DEGREE

Any one desiring to undertake a special and approved line of research, and whose attainments are such as to satisfy the requirements of the University, may also be received. This class includes persons who may desire to devote themselves exclusively to one or more of the special branches—mathematics, physics, chemistry, biology, psychology, pedagogy, economics and sociology, or history—but who do not care to matriculate or become candidates for a degree.

These students, provided they satisfy the heads of the departments of their training and competency in one subject, in which they must be advanced (although they may be less so, or even beginners, in other subjects), may be allowed entire freedom in their choice and combination of studies, and as special students may enjoy all the privileges of the University.

These students may, with the approval of the President, be received for less than an entire year.

Non-university students of less special or less advanced standing than the above classes, who contemplate becoming candidates for some higher degree, may also be received.

Students of this class must satisfy the authorities of the University of their attainments and that they contemplate advancing to a degree higher than that of A.B. The privileges and status of these students will be more fully defined later. They may, in exceptional cases, be elected to Scholarships.

FELLOWSHIPS AND SCHOLARSHIPS

From the George F. Hoar Fund of $100,000 provided by the generosity of Andrew Carnegie, the sum of $3,000 is now available for Junior and Senior Fellowships in the University. While the sums attached to these appointments are not fixed, a Senior Fellow may receive $200 together with the remission of fees; which makes the value of the appoinment $300. A Junior Fellow may receive $100 with remission of fees, which makes the value of the appointemnt $200. Besides these, other appointments of Senior and Junior University Scholarships, with remission of fees, are made.

FELLOWSHIP IN AMERICAN HISTORY

A Fellowship in American History will be awarded for the academic year, 1920–21, to be known as the American Antiquarian Society Fellowship. This has been established by the members of the American Antiquarian Society, and will be granted to a student whose major work is in some period of American History. The value of the Fellowship is $400.00 in addition to remission of tuition fees.

A CITIZEN'S FUND

A citizen of Worcester has given a fund of $5,000, the income of which is to be used for the aid of "some one or more worthy native born citizens of the city of Worcester who may desire to avail themselves of the advantages of the institution."

THE FIELD FUND

Mrs. Eliza W. Field has also given $500 to be called the "John White Field Fund," the income of which is "to provide for the minor needs of a Scholar or Fellow."

The following regulations apply to the award of the income of the Field Fund:

1. Regard is had to the intellectual ability of the candidate as well as to need of pecuniary assistance.
2. Only candidates who have spent three months at the University are considered.
3. The head of each department will consider and report to the Faculty desirable cases in his department.
4. Applications are received not later than December 15th, and the awards made as soon as possible after the Christmas recess.

THE ELIZA D. DODGE FUND

Mrs. Dodge has given $1,000 to be known as the "Eliza D. Dodge Fund," the income only to be expended in aid of graduate students of limited means engaged in research work.

PURPOSE AND CONDITIONS OF FELLOWSHIPS AND SCHOLARSHIPS

Fellowships at Clark University are intended for young men and women of promise who desire to pursue post-graduate studies in order to fit themselves for intellectual careers. It is desirable, but not required, that candidates for these positions should intend to proceed to the degree of Doctor of Philosophy or to equivalent attainments. In general, those intending to devote themselves to some special branch of learning are preferred to those directly fitting themselves for one of the three learned professions, although the latter are not excluded.

No application blanks are provided, but it is desired that the candidate should state fully and in writing his previous course of study and submit testimonials or diplomas, especially such as indicate a decided preference for some particular department. These should be accompanied also, if practicable, by some specimen of the candidate's work. Applications will be considered in April and in October and should be in the hands of the President on or before the first day of either month. In special cases vacancies may be filled by appointments at any time during the year. The names of unsuccessful candidates will not be made public.

Fellows must reside in Worcester during the entire academic year, devote themselves to special studies under the direction of their instructors, and give such evidence of progress or proficiency before the end of the year as the authorities shall require. It is generally expected that they will undertake some work of research during the year. They must coöperate in promoting harmony, order, and all the ends of the University, must not teach elsewhere, and may be reappointed at the end of the year. Being intended primarily as honors, both Fellowships and Scholarships are awarded without reference to pecuniary needs, so that those Fellows able and desiring to do so may relinquish the emolument and retain the title.

METHODS

Besides field work, excursions to institutions (public and private), coaching and cram classes, clubs, examinations, and other modes by which knowledge now seems best imparted and retained, the following educational methods are prominent:

Lectures. The Trustees desire that each instructor, of however few students, should prepare and deliver regular lecture courses, with diagrams, illustrative apparatus, and reference to standard text-books and the best current literature upon each topic. Advanced students are also encouraged to supplement the work of the professors by giving occasional special lectures and courses. Public lectures will be given from time to time.

Seminaries and Conferences. These are stated meetings for joint systematic work, under the personal direction of the professor, in some special part of his subject. Here students preparing theses and papers for publication in the journals edited at the University read them in incomplete form for mutual criticism and help. Here, also, the results of individual reading are reported for the benefit of all; views are freely criticised; new inquiries, methods, comparisons, standpoints, etc., suggested. From the mutual stimulus thus given many important works have proceeded and the efficiency of universities has been greatly increased.

Laboratory Work. For beginners this has been from the first the best of all forms of apprenticeship, bringing student and professor to a closer and mutually stimulating relation. Here the manipulation of apparatus is learned, processes are criticised, results obtained by other investigators are tested and methods discussed and perfected, with a view to developing that independence in research which is the consummation of scientific culture.

NOTICES

The charge for tuition, giving all the privileges of the University, but not covering the laboratory fees, is $100 per annum.

Board and lodging can be obtained near the University at very moderate rates.

Intending students will be given information, so far as possible, upon any of these or other points, in advance of official announcement, upon addressing the Clerk of the University, Miss Florence Chandler, Worcester, Mass.

All members of the University are expected to be present at the opening of each term and continue in attendance to its close.

The following are the statements and announcements of the departments for the academic year, 1920–1921.

I. MATHEMATICS

PROGRAMME FOR 1920–1921

INSTRUCTION IN MATHEMATICS

The chief aim of the department is to make independent investigators of such students as have mathematical taste and ability; these naturally look forward to careers as teachers of the higher mathematics in colleges and universities, and we believe that the course of training best adapted to the development of investigators is also that which is most suitable for all who would be efficient college professors, even if they are not ambitious to engage in research. The first essential of success in either of these lines is the habit of mathematical thought, and the direct object of our instruction is the acquisition of this habit by each of our students. With this end in view, we expect every student to make himself familiar with the general methods and most salient results of a large number of different branches of mathematics, conversant with the detailed results and the literature of a few branches, and thorough master of at least one special topic to the extent of making a real contribution to our knowledge of that subject.

In accordance with these principles, the instruction is given by means of introductory, advanced and special courses of lectures, seminaries, and personal guidance in reading and investigation.

The introductory courses (mostly given in alternate years) treat the following subjects:

ANALYTIC GEOMETRY OF CONICS, HIGHER PLANE CURVES, QUADRICS, HIGHER SURFACES, AND TWISTED CURVES; 5 hours a week, through the year.

DIFFERENTIAL EQUATIONS, AND CALCULUS OF VARIATIONS; 5 hours a week, through the year.

THEORY OF FUNCTIONS OF REAL AND IMAGINARY VARIABLES, ELLIPTIC FUNCTIONS, AND DEFINITE INTEGRALS; 5 hours a week, through the year.

THEORY OF NUMBERS; 2 hours a week, one half-year.

HIGHER ALGEBRA; 2 hours a week, through the year.

ALGEBRAIC SUBSTITUTIONS AND THEIR APPLICATION TO THE THEORY OF EQUATIONS; 2 hours a week, one half-year.

ALGEBRAIC INVARIANTS; 2 hours a week, one half-year.

FINITE DIFFERENCES; 3 hours a week, through the year.

It is expected that every student will take each course in the earliest year of his residence in which it is given, unless he has already completed an equivalent course elsewhere. The chief object of these courses is to make the student familiar with the various methods of mathematical research and the concepts of mathematical thought at the present day. Thus, for example, curves and surfaces are treated by modern methods from the beginning, with adequate consideration of the discoveries of the great geometers of recent times. The usual college courses in the theory of algebraic equations, analytic geometry, and the differential and integral calculus furnish all the necessary preparation for these introductory courses, although it is very desirable that the student be acquainted with the properties of determinants and their application to the solution of linear equations, and with the methods of solving differential equations of the simpler types. Deficiencies in these subjects may be made up by attendance on the corresponding courses in the Collegiate Department of the University.

Special advanced courses, open to all who are prepared for them, are given annually in subjects varying with the interests of the instructors and the needs of the students. These advanced courses are not repeated at regular intervals, but properly prepared students will receive the personal assistance of one or other of the instructors in reading any

subject not announced for the year in which they desire to take it.

The number and scope of the advanced courses given each year have been, thus far, regulated by the number of students qualified to profit by them and by the individual interests of the instructors; these courses will be increased, both in number and variety, whenever a real demand for such an increase shall make itself apparent. While the present purely scientific character of the University precludes instruction in strictly technical branches, we hope that the time is not far distant when the demand shall make it advisable, and increased facilities shall make it possible, to announce courses in Descriptive Geometry, Graphical Statics, Mathematical Astronomy, Vital Probabilities, and all the more important applications of mathematics to other sciences and to technical subjects. The applications of mathematics to physics already receive adequate consideration, and the further extension of such applications awaits only a demand for it on the part of students.

The subjects in which advanced courses may be expected to be given every few years include the following:

HISTORY OF MATHEMATICS.

ARITHMETIC: Numerical computations; Theory of numbers; Finite differences and the Calculus of operations; Probabilities and the Theory of errors; Continued Fractions and their Applications.

ALGEBRA: Substitution-groups and the Galois theory of equations; Invariants; Quadratic forms; Simultaneous equations (including Restricted systems); Multiple algebra.

HIGHER ANALYSIS: Differential equations, ordinary and partial; Continuous groups; Definite integrals and Fourier's series.

THEORY OF FUNCTIONS: Functions of real and complex variables; Point-aggregates; Elliptic functions; Abelian integrals.

GEOMETRY: Modern synthetic geometry; Analytic geometry of higher plane curves, higher surfaces, and twisted curves; Rational and uniform transformations of curves and surfaces; Infinitesimal geometry; Analysis situs; Quaternions; Hyperspace and non-euclidean geometry.

SYMBOLIC LOGIC.

Other courses will be given whenever there is a demand for them, as in the past. The instructors are always glad to assist students in any line of mathematics that falls within the range of their own studies. The small number of students makes it possible to give personal attention to individuals, and the intimate and confidential relation thus established between pupil and teacher is an advantage that cannot be overestimated and ought not to be left out of account by the prospective student in determining where his studies shall be pursued.

For the academic year 1920–21, the following courses of lectures are announced:

BY PROFESSOR STORY

Advanced Courses:

CALCULUS OF OPERATIONS (including Finite Differences); 4 hours a week, through the year.

THEORY OF ERRORS AND METHOD OF LEAST SQUARES; 3 hours a week, first half-year.

INFINITESIMAL GEOMETRY; 3 hours a week, first half-year.

ALGEBRAIC INVARIANTS; 3 hours a week, second half-year.

SEMINARY FOR ADVANCED STUDENTS; through the year.

BY PROFESSOR TABER

Introductory Course:

THEORY OF FUNCTIONS OF REAL AND IMAGINARY VARIABLES, AND ELLIPTIC FUNCTIONS; 5 hours a week, through the year.

Advanced Courses:

THEORY OF BILINEAR FORMS; 2 hours a week, first half-year.

THEORY OF INTEGRAL EQUATIONS; 2 hours a week, second half-year.

SEMINARY; through the year.

BY PROFESSOR WEBSTER

[See announcement of Department of Physics, courses 19, 20, 22, 23.]

BY M. DE PEROTT

Introductory Courses:

Theory of Numbers; 2 hours a week, first half-year.
Abelian Integrals; 2 hours a week, second half-year.

BY DR. WILLIAMS

Introductory Course:

Higher Algebra; 2 hours a week, through the year.

While desirous of supplying all possible facilities to those who wish to pursue studies in special branches, and to those who, already occupying permanent positions, have but a limited leave of absence, we have made it our chief object to provide a thorough training for those who, having just completed a college course, have not yet entered upon their life-work. This provision consists of such courses of lectures, seminaries, and individual assistance as should enable a faithful student endowed with the proper natural ability to satisfy the requirements for the degree of Doctor of Philosophy at the end of his third year with us. The requirements for this degree have been determined by our conception of the ideal teacher, as already stated. To acquire the necessary breadth of knowledge of mathematics as a whole, the candidate is expected to attend, during his first two years, specified introductory courses of lectures on the general principles, methods, and results of all the more important branches of pure mathematics, to supplement these lectures by private reading and to take an active part in the seminary. In the seminary, a special topic more or less directly connected with the subject of some lecture, is assigned, from time to time, to each student, who is required to read it up and make an oral report upon it before the class. Each candidate for the Doctor's degree is expected to attend a number of advanced courses. He spends the greater part of his third year in the original investigation, under the constant personal guidance of one of the instructors, of a topic of his own selection. In preparing for this investigation he is required to make a practically complete bibliography of the subject and to read all the more important available articles that have been written on it. The results of the investigation, embodied in a dissertation suitable for printing, must be submitted to the instructor under whose direction the work was done, and must receive his approval before the candidate will be admitted to the final examination for the degree. This approval will not be given unless the dissertation is satisfactory in form and completeness and the results are sufficiently novel and important to constitute a real contribution to science. The dissertation is, in fact, the main criterion by which the candidate is judged, and no amount of other work will compensate for its defects.

Each of the instructors is engaged in research and has always a number of investigations planned for himself, which have often been carried to a well advanced stage but are not completed for want of time. Such incomplete investigations are given to properly prepared candidates for the Doctor's degree, and they receive from the instructor all the assistance necessary for the completion of the work, thus becoming, to a certain extent, collaborateurs with the instructor.

The preparation of a bibliography of any topic is greatly facilitated by a classified index of mathematical literature on the card-catalogue plan, which has been prepared under the supervision of Professor Story and now includes over one hundred thousand titles of periodical articles, separate memoirs, and books in all fields of pure mathematics. This index is much more complete than the Royal Society's catalogue, even in the restricted field of that catalogue (periodicals published between 1800 and 1900), and will be extended as rapidly as possible.

The ability of our graduates to carry on research and the excellence of the work actually done is assured by the regulation that each dissertation accepted by us as worthy of the degree shall be printed with the explicit approval of a member of our Faculty. It is evident that, whereas any one that has the necessary preparation and taste for mathematics may profit by the advantages here afforded, only those who have a certain amount of mathematical genius can secure the degree.

In making appointments to fellowships and scholarships we have endeavored to maintain the same high standard. We are on the lookout for mathematical geniuses; but it is difficult to determine from the evidence of others whether candidates come up to our standard or not; so that we have adopted the general policy of giving the best appointments to those only that have been with us for at least one year, and about whom we are in position to judge for ourselves. Of course, this policy could not be carried out during the earlier years of the University, and its effect is apparent in the fact that, whereas seventy-five per cent of the students that entered the mathematical department during the first three years remained with us but one year, only thirty-three per cent of those that have been admitted from 1892 to the present time left at the end of their first year. We do not mean to imply that those who left before completing our course were inferior in ability to those who remained three years, but we desire particularly to encourage men who can and will go forward to the degree.

Nearly all of those who have studied mathematics with us have adopted teaching as a profession, sixty-eight per cent are now members of college faculties, and thirteen per cent are engaged in higher school work. Those who have received the doctor's degree have generally secured at once desirable positions in which to begin their life-work, and most of them have already acquired for themselves, by distinguished ability, very decided influence in the institutions with which they are connected.

The degree of Master of Arts will be conferred upon students who complete with credit an approved course of one year and present a satisfactory thesis.

Every facility for the study of special branches will be given to properly prepared students who are not candidates for a degree, as also to those who, having already attained to the Doctor's degree (here or elsewhere), wish to continue mathematical study or investigation.

MATERIAL FACILITIES

The library is provided with the more important text-books, treatises, and memoirs on the various branches of mathematics, as well as the principal journals and transactions of learned societies that are devoted to any considerable extent to mathematics. A list of these journals will be found below.

The mathematical department possesses a good collection of models, a Thomas arithmometer, and an Amsler planimeter with revolving table.

LIST OF JOURNALS RELATING TO THE EXACT SCIENCES IN THE UNIVERSITY LIBRARY

(On account of the European war some of the foreign journals marked "to date" are incomplete.)

AMSTERDAM.

Koninklijke akademie van wetenschappen. Verhandelingen, 1854 to date. Complete.

Revue semestrielle des publications mathématiques. 1893 to date. Complete

BALTIMORE.

American chemical journal. 1879 to date. Complete.

American journal of mathematics. 1878 to date. Complete.

BANGKOK.

Siam society. Journal. 1905-07

BERLIN.

Berliner mathematische Gesellschaft. Sitzungsberichte. 1902 to date. Complete

Chemisches Centralblatt. 1897 to date. Complete.

Deutsche chemische Gesellschaft. Berichte. 1868 to date. Complete.

Fortschritte der Physik. 1847 to date. Complete.

Jahrbuch über die Fortschritte der Mathematik. 1868 to date. Complete.

Journal für die reine und angewandte Mathematik. 1826 to date. Complete.

Königlich-preussische Akademie der Wissenschaften. Mathematische und naturwissenschaftliche Mittheilungen aus den Sitzungsberichten. 1882-97. Complete.

Zeitschrift für angewandte Chemie. 1888 to date. Complete.

BOLOGNA.

Istituto di. Bologna. Reale academia delle scienze.

Commentarii. 1731-1791. Complete.

Novi commentarii. 1834-1849.

Memorie fis. e mat. 1806-1910.

Memorie. 1850 to date. Complete.

Scientia; rivista di scienza. 1910 to date. Complete.

BOSTON.

American academy of arts and sciences. Proceedings. 1870 to date. Complete.

North American Review. 1815-1886.

Technology review. 1899 to date. Complete.

BOULDER, COLORADO.

University of Colorado. Studies. 1902 to date. Complete.

BRAUNSCHWEIG.

Deutsche physikalische Gesellschaft. Berichte. 1903 to date. Complete.

Jahresbericht über die Fortschritte der Chemie. 1847 to date. Complete.

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Kaiserlich-Leopoldinisch-carolinische deutsche Akademie der Naturforscher. 1843.

BRUXELLES.

Académie royale des sciences des lettres et des beaux-arts de Belgique.

Bulletins. Ser. 3. 1889 to date.

Mémoires couronnés et mémories des savants étrangers. 1889-90.

CAMBRIDGE, ENGLAND.
- Cambridge philosophical society.
  - Proceedings. 1843 to date. Complete.
  - Transactions. 1822 to date. Complete

CAMBRIDGE, MASSACHUSETTS.
- Science. 1883 to date. Complete.

CHARLOTTESVILLE, VIRGINIA.
- Annals of mathematics. 1884 to date. Complete.

CHICAGO.
- Astrophysical journal. 1895 to date. Complete.
- School science and mathematics. 1901 to date. Complete except vol. 13, Nos. 1-2.
- Terrestrial magnetism. 1896 to date. Complete.

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- University of Missouri studies. Science series. vol. 1. 1905-07.

DRESDEN.
- Zeitschrift für Chemie und Industrie der Kolloide. 1906 to date. Complete.

EASTON, PENNSYLVANIA.
- American chemical society.
  - Chemical abstracts. 1907 to date. Complete.
  - Journal. 1879 to date. Complete.
  - Proceedings. 1878 to date. Complete.
  - Journal of industrial and engineering chemistry. 1909 to date. Complete.

EDINBURGH.
- Edinburgh mathematical society. Proceedings. 1884-1907.
- Edinburgh philosophical journal. 1819-1826.
- Edinburgh royal society transactions. 1873 to date. Complete.

GÖTTINGEN.
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GREIFSWALD.
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HAARLEM.
- Hollandsche maatschappij der wetenschappen. Archives néerlandaises des science exactes et naturelles. 1866 to date. Complete.

HALIFAX.
- Nova Scotian institute of science.
  - Proceedings and transactions. Halifax. 1890 to date. Complete.

HALLE.
- Zeitschrift für Electrochemie. 1895 to date. Complete.

HAMBURG.
- Mathematische Gesellschaft. Mittheilungen. 1890 to date. Complete.
- Zeitschrift für anorganische Chemie. 1892 to date. Complete.

HEIDELBERG.
- Annalen der Chemie. 1832 to date. Complete.

INDIANAPOLIS.
- Indiana academy of science. Proceedings. 1895-98.

ITHACA.
- Journal of physical chemistry. 1896 to date. Complete.

LAWRENCE, KANSAS.
- Kansas University science bulletin. 1902-1908.

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- Acta Eruditorum, 1682-1731. 50 vols. Supplementa, 1692-1734. 10 vols. Indices generales, 1693-1733. 10 vols. in 5.
- Nova Acta Eruditorum, 1732-1782. 13 vols. Supplementa, 1735-1739. 3 vols. in 2.
- Annalen der Physik. 1824 to date. Beiblätter, 1889 to date. Complete.
- Archiv für Optik. vol. 1. 1908.
- Chemische Novitäten. 1905-08.
- Deutsche Mathematiker-vereinigung. Jahresbericht. 1890 to date. Complete.
- Encyklopädie der mathematischen Wissenschaften mit Einschluss ihrer Anwendungen.
- Fortschritte der Chemie, Physik und physikalischen Chemie. 1909.
- Internationale Mathematiker-congresse. Verhandlungen. 1897 to date. Complete.
- Jahrbuch der drahtlosen Telegraphie und Telephonie. 1908 to date. Complete
- Jahresbericht über die Leistungen der chemischen Technologie. 1856 to date Complete.
- Journal für praktische Chemie. 1834 to date. Complete.
- Königlich-sächsische Gesellschaft der Wissenschaften.
    - Berichte über die Verhandlungen der mathematisch-physischen Classe. 1840 to date. Complete.
    - Abhandlungen der mathematisch-physischen Classe. 1852 to date. Complete.
- Mathematische Annalen. 1869 to date. Complete.
- Zeitschrift für Chemie. 1866-71.
- Zeitschrift für Mathematik und Physik. 1856 to date. Complete.
- Zeitschrift für physikalische Chemie. 1887 to date. Complete.
- Zeitschrift für mathematische und naturwissenschaftliche Unterricht. 1903 to date.
- Zeitschrift für wissenschaftliche Photographie, Photophysik und Photochemie. 1903 to date. Complete.

LIÈGE.

- Société royale des sciences. Mémoires. 1843 to date. Complete.

LONDON.

- British academy. Proceedings. 1905. 1907.
- British association for the advancement of science. Reports. 1831 to date. Complete.
- Chemical news and journal of physical science. 1904 to date. Complete.
- Chemical society of London.
    - Annual reports on the progress of chemistry. 1905 to date. Complete.
    - Journal. 1849 to date. Complete.
- Electrician. 1891 to date. Complete.
- International catalogue of scientific literature. 1902 to date. Complete.
- London mathematical society. Proceedings. 1865 to date. Complete.
- Royal Society.
    - Proceedings. 1800 to date. Complete.
    - Philosophical transactions. 1665 to date. Complete.
    - Mathematical gazette. 1896 to date. Complete.
- Nature. 1870 to date. Complete.
- Nineteenth century. 1877 to date. Complete.
- Philosophical magazine. 1798 to date. Complete.
- Physical Society of London. 1876 to date. Complete.
- Quarterly journal of pure and applied mathematics. 1857 to date. Complete.

LONDON (Continued).
Quarterly review. 1809-1885.
Science abstracts. 1898 to date. Complete.
Science progress in the 20th century. 1907 to date. Complete.
MADISON.
Wisconsin academy of arts and sciences. Transactions. 1898.
MANILA.
Philippine journal of science. 1906 to date. Complete.
MILANO.
Annali di matematica, pura ed applicata. 1889 to date.
Reale istituto lombardo di scienze e lettere. Classe di scienze mathematieech naturali.
Rendiconti. 1864-67. Complete.
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Memorie. 1843 to date. Complete.
MONTREAL.
Royal Society of Canada. Proceedings and transactions. 1882-1906.
München
Königlich bayerische Akademie der wissenschaften. Sitzungsberichte der mathematisch physikalischen Klasse. 1871 to date. Complete.
NEW HAVEN.
American journal of science and arts. 1871 to date. Complete.
NEW YORK.
American mathematical society.
Annual register. 1892 to date. Complete.
Bulletin. 1894 to date. Complete.
Transactions. 1900 to date. Complete.
American society of biological chemists. Proceedings. 1907 to date. Complete.
Appleton's journal of literature, science and art. 1869-76.
Electrical world and engineer. 1907 to date. Complete.
Journal of biological chemistry. 1905 to date. Complete.
The Minerva. 1824-26.
New York Mathematical Society. Bulletin. 1891-94. Complete.
Popular science monthly. 1872 to date. Complete.
Physical review. 1894 to date. Complete.
OXFORD.
Messenger of mathematics. 1862 to date. Complete.
PALERMO.
Circolo matematico di Palermo. Rendiconti. 1887 to date. Complete.
PARIS.
Annales de Chemie et de physique. 1789-1908.
Annales scientifiques de l'École normale supérieure. 1864 to date. Complete.
Association française pour l'advancement des Sciences. Comptes rendus des sessions. 1873 to date. Complete.
Bulletin des sciences mathématiques. 1870 to date. Complete.
Bureau international des poids et mesures. 1881 to date. Complete.
École polytechnique. Journal. 1794 to date. Complete.
Institut de France. Académie des sciences. Comptes rendus hebdomadaires des séances. 1835 to date. Complete.
Journal de mathématiques pures et appliquées. 1836 to date. Complete.
L'éclairage électrique. 1894-1907.

PARIS (Continued).

L'enseigmement mathématique. 1899 to date. Complete.
Nouvelles annales de mathématiques. 1842 to date. Complete.
Revue des deux mondes. 1908 to date. Complete.
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Revue scientifique. 1863 to date. Complete.
Société chimique de Paris. Bulletin. 1858 to date. Complete.
Société mathématique de France. Bulletin. 1873 to date. Complete.

ST. PETERSBURG.

Journal of physical chemistry. (Russian Text.) Chemical section and physical section. 1909 to date.

PHILADELPHIA.

Academy of natural sciences of Philadelphia. Proceedings. 1890 to date. Complete.
American electrochemical society. Transactions. 1902 to date. Complete.
Lippincott's magazine of literature, science and education. 1868-1881.

PISA.

Il Nuovo Cimento. 1891 to date. Complete.

ROME.

Reale accademia dei lincei. Atti. Rendiconti. etc. 1847 to date.

SACRAMENTO.

Lick observatory. Publications. 1887-1903.

SALEM, MASSACHUSETTS.

American Association for the advancement of science. Proceedings. 1848 to date. Complete.

SIDNEY.

Australasian association for the advancement of science. 1888 to date. Complete.

STOCKHOLM.

Acta mathematica. 1882 to date. Complete.
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STRASSBURG.

Zeitschrift für physiologische Chemie. 1877 to date. Complete.

STUTTGART.

Jarhbuch der organischen Chemie. 1908 to date. Complete.
Sammlung Chemischer und chemisch-technischer Vorträge. 1896 to date. Complete.

TOKYO.

Journal of the College of Science of the Imperial University of Japan.
Mathematico-physical society. Proceedings (Tôkyô sûgakubuturigakkwai kizi). 2nd Ser. 1901 to date. Complete.

TOULOUSE.

Université de Toulouse. Faculté des sciences. Annales. 1887 to date. Complete.

URBANA, ILLINOIS.

University of Illinois. University studies. 1900-1908.

WASHINGTON, D. C.

National academy of sciences.
- Biographical memoirs. 1877 to date. Complete.
- Memoirs. 1883-1902.
- Reports. 1883 to date. Complete.

WASHINGTON, D. C. (Continued).

U. S. Bureau of Standards. Bulletin. 1905 to date. Complete.

U. S. Naval observatory. Publications 1900-1903.

U. S. Naval observatory. Astronomical and meteorological observations. 1885, 1889.

WIESBADEN.

Zeitschrift für analytische Chemie. 1862 to date. Complete.

WIEN.

Kaiserliche Akademie der Wissenschaften.

Denkschirften; mathematisch-naturwissenschaftliche Classe. 1850-1908.

Sitzungsberichte der mathematisch-naturwissenschaftlichen Classe. 1848 to date. Complete.

Monatshefte für Mathematik u. Physik. 1908.

Monatshefte für Chemie und verwandte Theile anderer Wissenschaften. 1881 to date. Complete.

WORCESTER.

The Mathematical review. 1896–97.

II. PHYSICS

The academic year 1918–1919 proved in many ways an exceptional year for the Department of Physics, and for it as for many other undertakings the Great War has constituted a line of demarcation between the past and the future. Opportunity has been taken to rearrange the work of the Department, and to arrange the cycle of lectures on a basis of three years instead of two, thus giving opportunity for a more extensive treatment of the various subjects, while avoiding the strain of the high speed that has hitherto been necessary. Attention is also called to the new course intended for students from other departments who have not had such mathematical preparation as should be presupposed for students desiring to make a serious study of mathematical physics.

Attention should be called to the fact that the Department of Physics of Clark University is exclusively a department for graduate study and research in pure and applied physics. The experiences of the war have shown that in almost every department of activity the careful and exact methods of the physicist have been of the greatest utility. It has in fact turned out that the business of war is to a large extent an application of physics and chemistry. To those who reply that it is rather a matter of engineering the answer must be made that engineering is applied physics and chemistry, and that for many purposes an engineer may be defined as an imperfectly educated physicist. At any rate many engineering questions have been treated in this department, and many graduates of engineering schools have resorted hither for additional training. It is believed that in the future educational history of the country such resort must largely increase, and the distinction between pure and applied science be more and more broken down At any rate success in applied science cannot be expected without thorough training in the principles of pure science. In order to set forth to the intending student the facilities of this department, stress may be laid on a number of points in which it is believed that the conditions here are exceptional.

First, the fact that the attention of the professor is not distracted from the needs of the student by other duties, which, combined with the small number of students in the department, enables an amount of personal attention to be given to each one which is perhaps unique in this country. The head of the department is able to see each student and to give him personal advice in the conduct of his researches or his studies every day if necessary. The facilities without which no graduate department of research in physics can be complete are comprised under three heads: first, a systematic course of lectures in theoretical or mathematical physics; second, a laboratory with a sufficient number of rooms for individual work and with a sufficient equipment of apparatus and an instrument shop for the speedy production of whatever may be necessary for the research in hand; third, a library containing the classic works on physics, with full sets of journals and proceedings of learned societies by which the history of progress, past and present, may be studied, and kept up-to-date by the continual purchase of the latest works. In all these directions the facilities offered by this department invite attention.

The lecture courses are so arranged as to cover in a cycle of three years all the principal subjects and methods of theoretical physics. The pursuit of them will fit the student to read and study with facility any memoirs on theoretical physics. The courses are so arranged that it is possible for a student to begin in either year of the cycle. Thus a short course in dynamics is offered every year, and the courses in electricity and partial differential equations are broken up into parts which may be taken independently one of another. The regular courses are those not marked with a star, and constitute a course of from five to seven hours weekly. The starred courses are delivered at irregular intervals, according to the demands or the presence of students of sufficient advancement.

LECTURES

1. DYNAMICS. THE FUNDAMENTAL PRINCIPLES OF DYNAMICS, INCLUDING THE USE OF THE PRINCIPLE OF HAMILTON AND THE EQUATIONS OF LAGRANGE.

This course will be repeated yearly.

2. DYNAMICS. GENERAL PRINCIPLES, EQUATIONS OF LAGRANGE AND HAMILTON, METHODS OF HAMILTON AND JACOBI, SYSTEMS OF PARTICLES.

This course is fundamental for the pursuit of all the others, and includes a detailed account of the principle of Least Action and the differential equations of Lagrange, preparatory to their application to other parts of mathematical physics such as optics and electricity.

3. MOTION OF RIGID BODIES, AND THE THEORY OF MOVING AXES.

This course takes up the theory of tops and rotating bodies, including the multifarious applications of the Gyroscope in engineering and war.

4. NEWTONIAN AND LOGARITHMIC POTENTIAL FUNCTIONS, ATTRACTION OF ELLIPSOIDS.

This course is a necessary preliminary to the study of electricity and magentism, of hydrodynamics, and of the figure of the earth.

5. THEORY OF STRESS AND STRAIN, OF LINEAR VECTOR FUNCTIONS, AND OF ELASTICITY.

6. HYDRODYNAMICS, WAVE AND VORTEX MOTION, DYNAMICAL BASIS OF SOUND AND LIGHT.

These courses are the basis of applications of the theory of wave motion to sound, light, electro-magnetism, and earthquake waves, and to the study of meteorology.

7.* DYNAMICS OF CYCLIC AND OSCILLATORY SYSTEMS, WITH APPLICATIONS TO THE THEORY OF ELECTRICITY, SOUND AND LIGHT.

The substance of the preceding courses is contained in Professor Webster's Treatise on Dynamics, B. G. Teubner, Leipzig.

For the theory of Vibrations of all kinds, see Course 19c.

8.* THE THEORY OF RESONANCE AND OF GENERALIZED IMPEDANCE WITH APPLICATIONS TO THE MEASUREMENT OF SOUND AND TO WIRELESS TELEGRAPHY AND TELEPHONY. THE GENERAL THEORY OF MUSICAL INSTRUMENTS AND OF ACOUSTICAL ENGINEERING.

This course takes up Professor Webster's original researches in acoustics, and also shows how the methods there employed bear on the fundamental electrical phenomena involved in wireless telegraphy. It also takes up the practical questions involved in the design of auditoriums and questions of vibrations.

9. THE THEORY OF ELECTROSTATICS AND MAGNETOSTATICS, WITH THEIR RELATIONS TO ELECTRICITY.

10. ELECTROMAGNETISM, THE THEORY OF THE ELECTROMAGNETIC FIELD IN THE QUASI-STATIONARY STATE, ELECTRIC WAVES. THE CLASSICAL THEORIES AND THE THEORY OF MAXWELL.

The substance of these courses is found in Professor Webster's Mathematical Treatise on the Theory of Electricity and Magnetism, London, Macmillan & Co.

11. RECENT DEVELOPMENTS IN ELECTRICAL THEORY, INCLUDING THE THEORY OF LORENTZ AND THE PRINCIPLE OF RELATIVITY.

The application to the theory of electrons and to the optics of bodies in motion.

12. THE THEORY OF LIGHT. PROPAGATION OF LIGHT, DIFFRACTION, REFLECTION AND REFRACTION, DISPERSION, DOUBLE REFRACTION, POLARIZATION, METALLIC REFLECTION, MAGNETO-OPTICS, X-RAYS AND CRYSTALS.

13.* COMPARISON OF THEORIES OF THE ETHER.

Critical and historical examination of the various mechanical explanations of the luminiferous ether, including those of Green, McCullagh, Kelvin, Maxwell, Sommerfeld and Larmor.

14.* GEOMETRICAL OPTICS. PROPERTIES OF SYSTEMS OF RAYS, AND THEIR VARIOUS ABERRATIONS. HAMILTON'S CHARACTERISTIC FUNCTION OR EIKONAL. APPLICATIONS TO OPTICAL INSTRUMENTS.

15. THERMODYNAMICS. THERMO- AND ELECTRO-CHEMISTRY.

The establishment of the two laws of thermodynamics, and their application, by means of the methods of Gibbs and Helmholtz, to the examination of physical and chemical phenomena. Application to heat-engines, including steam, gas, and oil engines, the flow of gases and vapors, and the steam turbine. The conditions of chemical equilibrium, phenomena of electrolysis, osmotic pressure, and capillarity. Nernst's Theorem.

16. THE KINETIC THEORY OF GASES. THE MAXWELL-BOLTZMANN THEOREM AND THE ELEMENTS OF STATISTICAL MECHANICS.

17.* THE THEORY OF RADIATION AND OF A BLACK BODY.

The relations obtained from the laws of Kirchhoff, Stefan, Wien, and Planck, by the recent applications of thermodynamics.

18.* THE PHENOMENA OF CONDUCTION OF ELECTRICITY IN GASES, AND OF RADIOACTIVITY, AND THEIR BEARING ON THE STRUCTURE OF THE ATOM.

19. THE PARTIAL DIFFERENTIAL EQUATIONS OF MATHEMATICAL PHYSICS.

Laplace's Equation, Equation of Thermal and Electrical Conduction, Equation of Wave-motion, Helmholtz's Equation, Lorenz-Beltrami Equation, Telegrapher's Equation, and their special cases, in one, two or three dimensions.

This course will be divided into three parts:

a. Deduction of the Equations. Vector Analysis. The older methods, including those of Cauchy and Fourier. Developments in Series, Trigonometric Series, Legendre's, Laplace's, Bessel's, Lamé's Functions.

b. Methods of Green and Riemann-Volterra, boundary problems.

c. Theory of Vibrations and Normal Functions, Genesis of Partial Differential Equations and Integral Equations.

This complete course is probably the most important of all for the theoretical physicist, and treats a great variety of subjects from the most varied fields, grouping them all into a connected system, and embracing all the methods of theoretical physics.

The above lectures are to be found in Professor Webster's Treatise on the Partial Differential Equations of Mathematical Physics, which, being in press with Teubner, has been held up for five years, but which may be expected to appear from the Cambridge University Press during the year.

20.* THE ELEMENTS OF INTEGRAL AND INTEGRODIFFERENTIAL EQUATIONS, AND THEIR APPLICATIONS TO MATHEMATICAL PHYSICS.

21.* SELECTED CHAPTERS IN THE APPLICATION OF THEORETICAL PHYSICS TO COSMICAL PHENOMENA, INCLUDING PROBLEMS IN GEODESY, THE TIDES, METEOROLOGY, SEISMOLOGY, AND TERRESTRIAL MAGNETISM.

22.* LINEAR DIFFERENTIAL EQUATIONS.

The applications of the Theory of Functions to the linear differential equations of the second order which arise in mathematical physics.

23.* ORTHOGONAL SURFACES AND CURVILINEAR COORDINATES AND THEIR APPLICATIONS.

24. INTRODUCTION TO THEORETICAL PHYSICS.

This course is intended for students in other subjects than physics, whose mathematical training in college leaves something to be desired, and who nevertheless need to have some knowledge of mathematical physics. The mathematical methods needed will be carefully explained in an elementary manner.

The courses for 1920–21 will be 1, 3, 12, 15a, 16, 19b. For 25, 26, 27, 28 see below. It is possible that Professor Webster will be absent during the year 1920–21, but the courses will be in capable hands.

In addition to the above formal courses there is held a weekly Colloquium, or meeting for the informal discussion of subjects not treated in the lectures, and for the presentation by the students of reports on important articles appearing in the journals. A part of the work of the colloquium consists in the systematic presentation of certain classical researches, more or less connected with the lectures, in preparing which the students make use of the original sources of information, thus gaining much acquaintance with the methods of the masters in research. The work of the colloquium has an excellent effect in training students to present their ideas in a systematic manner before an auditory.

Among the various lines of investigation now attracting the attention of physicists the following are preëminent in importance. First, the interrelations between the luminiferous ether and ordinary matter, and the modifications necessary to be made in Maxwell's theory in order to explain the known optical and electrical phenomena of bodies in motion, and that aspect of the theory which deals with the properties of the small electric bodies known as electrons. This portion of mathematical physics is extremely new, and has hardly begun to appear in university courses in this country. Second, the structure of the atoms of matter, to which the subjects of spectroscopy and the new and fascinating field of radio-activity give the most promising clew. Third, the thermodynamics of radiation in general, which is most intimately connected with the first, and about which a similar remark may be made as to the lack of instruction.

Of branches of applied physics now awaiting the attention of the mathematical physicist may be mentioned meteorology, seismology, and geophysics in general, in all of which the accumulation of experimental data is ahead of the development of theory. The theory of meteorology depends on complicated applications of hydrodynamics and thermodynamics; so as to make great demands upon the mathematical physicist, but the field is a rich one to him possessed of the skill to cultivate it. The study of earthquake phenomena is one that is now becoming of great importance in this country, while the investigation of terrestrial magnetism has lately made great advances.

In addition should be mentioned the applications of mathematical physics to engineering, which become more and more important every day. In foreign countries this has long been recognized, but the American engineer is now beginning to take advantage of the courses open to him, as is instanced by his attention to the subject of electric waves, wireless telegraphy, the theory of vibrations, and the theory of the gyroscope. In order to show the variety of subjects that the physicist may treat, it may be stated that in the last few years the head of this department has been consulted or brought into court as an expert on the motion of human bodies in an automobile accident, the gyroscope in the torpedo, and the gyro-compass, the motion of spindles in the textile industry, the balancing of automobile engines and shafts, the sound of the Klaxon horn, the improvement of the phonograph, the collapse of a building by undermining of gravel, the transmission of speech over a telephone line, and the properties of guns and projectiles. The principles underlying all these and other matters of practical importance are covered in these lectures.

It is almost obvious to the trained investigator that no one can expect to become a physicist of the first rank without a throough training in mathematical physics as without that the results of experiment will never be collected into a coherent system worthy the name of an exact science. Furthermore all mathematical physics must rest upon mechanics, the principles of which are of an importance transcending that of any other branch of natural science. It is for this reason that the courses in physics in this department begin with mechanics, and are developed progressively in a systematic manner. They have the advantage of having been deliberately planned for the needs of students of pure physics, as experience has shown them to be prepared by the various colleges, and of being all delivered by the same person, so that logical consistency and continuity of method are assured. The waste of time often incurred by repetitions of the same subject and of changes of notation by various instructors is thus totally avoided. Attention is called to the fact that *no branch of physics is left unprovided for in the courses of lectures.*

It should be urged upon intending students to prepare themselves, not only in ordinary laboratory measurements, but also in mathematics, the lack of proper mathematical preparation being a serious drawback to the appreciation of the lectures. In particular may be recommended for study not merely those portions of the calculus which deal with the working out of many indefinite integrals, etc., but the theoretical portions which deals with the ideas of partial derivatives, definite integrals, and their practical manipulation, together with enough analytic geometry to involve the properties of lines and *surfaces* of the second order, and a fair amount of the elements of determinants. As suitable textbooks for preparation may be recommended to the student Lamb's, Osgood's or Gibson's Calculus, C. Smith's Analytical Geometries, and Muir's or Hanus's Determinants. Appell, *Eléments de l'analyse mathématique* may be very strongly recommended to the intending student for study before and during his course at the University.

It cannot be too strongly urged that the student should, from the beginning, be able to read French and German with ease and to make use of works in them.

REQUIREMENTS FOR THE DOCTOR'S DEGREE

1. The ability to read at sight specimens of scientific French and German, tested before the first of November preceding the Doctor's examination by a committee of two members of the Faculty.

2. The successful passing of an examination upon the general subject of Experimental Physics[1] and upon the subjects named above in the regular course in Theoretical Physics, as a major requirement, together with an examination in one minor subject, *to be determined in each particular case by the head of the Physical Department.* This subject will be Mathematics or Chemistry.

3. The presentation of a satisfactory dissertation, involving a substantial amount of original work, and forming a contribution of value to pure science. The presentation of the dissertation is a prerequisite to examination. The time of residence necessary for the proper fulfilment of the above requirements will generally be at least three years, of which at least one will be very largely devoted to work on the dissertation. Students will not be encouraged to enter upon the work of a dissertation until they have acquired sufficient experience to enable them to specialize with advantage.

The aim of the department is to produce physicists rather than electricians, acousticians, opticians, engineers, or narrow specialists of any sort, for although in the nature of things one will be obliged to know more of one subject than of others, yet it seems evident that no thorough knowledge of any branch can be gained without a comprehensive view over the whole subject. Without this the specialist, or the experimentalist lacking a knowledge of mathematics, will continually be falling into pitfalls which the more wary avoid. Furthermore it can be but a detriment to science to encourage research in new fields by immature and ill-prepared minds and hands.

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[1] Every student is recommended to provide himself with Winkelmann's *Handbuch der Physik* or Chvolson, *Traité de Physique.*

The following statement is here inserted for the benefit of students of mathematics.

The minor in Mathematical Physics consists of the subject-matter of courses 2, 4, 5, 6, 19a 19b which are intended to constitute the equivalent of five hours a week for one year.

THE LABORATORY

The laboratory occupies three floors of one wing of a large well lighted building free from disturbances, and admirably adapted to the purposes of a physical laboratory. On the ground floor is a room extending across the end of the building forty-five feet long by twenty-two feet wide, with windows on three sides, above which are three similar rooms. A lift running from the bottom to the top floor affords means of transporting apparatus, while its shaft furnishes space for manometer or barometer tubes. In the lower room are four piers with heavy stone tops, and two others below the floor on which can be placed heavy tables.

Also on the ground floor is a large dark room, partially below ground, in which the temperature is tolerably constant, containing a very large and heavy pier. The engine and storage-battery room contains a kerosene engine and dynamo on the same foundation and sixty storage cells of ten amperes capacity, constituting the power-supply. The engine may be started at a few moments notice, even at night, but has been superseded for most purposes by a motor-generator which is driven by an external supply and furnishes all needed direct current. The storage cells are conveniently arranged so that each one is accessible from each side, from above and below, and the ventilation is excellent, while the room is as light and clean as the work-rooms. Distributing switchboards allow the current from the dynamo or any section of the battery to be supplied to any of the rooms. On the same floor are three rooms constituting the workshop, one of the most important parts of a research department of physics. The first room is devoted to wood-working and pattern-making, and accommodates also a bench for soldering. The next room contains the machinist's bench, two engine-lathes and drill-press, and the third room a Rivet precision bench-lathe, jeweler's lathe and Brown & Sharpe universal milling-machine. There is no countershafting in the building, each tool being driven by a separate electric motor, so that perfect quiet and steadiness are ensured. In the shop are executed all repairs and alterations of apparatus, and the new apparatus requiring continual experiment is constructed. Most of the principal pieces of apparatus belonging to this department have been thus constructed. In this manner, by having a mechanic always present, an extremely great economy in time and money is effected, and vexatious delays, which would otherwise completely arrest the progress of the work, are avoided. Facilities and encouragement are given to the students to construct apparatus for themselves.

On the main floor are the lecture room, the director's office, the large room used as the director's private laboratory and apparatus room, and three other conveient rooms for research, Two of these are arranged so that they may be darkened for photography, and one is heavily padded with felt for acoustical researches. The large room on the top floor is diagonally divided into two, one dark and devoted to the Rowland twenty-foot diffraction grating and other spectroscopic apparatus, and with a photographic dark room attached. Close by is a high potential battery of two thousand small storage cells. Every room in the laboratory contains sinks, gas and electric light connections, and several circuits connecting with the switch-board in the battery-room.

The laboratory is well equipped with apparatus for research besides having the facilities above described for the construction of instruments of any sort needed for that purpose. In addition may be mentioned a large collection of diagrams illustrative of mathematical physics, many of them being originals of the figures in Professor Webster's "Electricity and Magnetism" and "Dynamics," and a number of interesting models used in teaching dynamics, thermodynamics, and electricity. Among them are Maxwell's Dynamical Top and a number of other interesting tops, Maxwell's and Rayleigh's induction models, Gibbs's, van der Waals's and other thermodynamical surfaces. This collection of drawings and models can probably not be matched in this country, and is continually being increased.

The laboratory affords so much space that it is rarely necessary to put more than one student in a single room. Every student receives personal attention in the laboratory from the professor whenever he needs it, and is continually in receipt of instruction and suggestion by personal contact, the best form in which information can be imparted. Emphasis should be laid on the advantage to the research student of the contact with a professor who has no other duties or interests than the furtherance of research, in an institution devoted to this as its main object.

THE BALLISTIC INSTITUTE

During year 1918, and in the desire to contribute to the work of the war, a new department of research was opened, which is a very natural application of the methods above described, and for which the facilities already existed in high degree. This was an institute of ballistic research, in which investigations of all sorts on the properties of guns and projectiles and the physical laws involved in their operation may be made. From the time that the long-range gun began to bombard Paris from a distance of seventy miles, the subject of Ballistics was taken up in the colloquium and in lectures, and the services of every member of the department were enlisted in contributing to the subject. A paper on the Exterior Ballistics of Long-Range Guns was presented at the meeting of the American Philosophical Society at Philadelphia in April, and at the National Academy of Sciences in the same month, and several experimental papers have been read at the meetings of the latter and of the American Physical Society. Seven or eight papers have appeared, and others are nearly ready

A plan of research of great variety has been laid down, as it turns out that there is research enough upon this subject to last for years. A small but very capable staff was engaged, chiefly with funds from outside the University, thoroughly equipped to carry out research in the subject stated. The position of the Director as a member of the Naval Consulting Board of the United States has brought him into close touch with both the Navy and the Army and has afforded him unusual opportunities for getting acquainted with practical ballistic problems. For instance he has been invited to the Coast Artillery School at Fort Monroe, and all the publications of that school have been sent to him, as well as those of the Navy on Ballistics. Dr. Louis Thompson, who was for several years research assistant to Professor Webster, spent two months at the Coast Artillery Training Camp at Fort Monroe, Va., taking the advanced course in Gunnery for officers.

The Department has unusual facilities for doing research of all kinds. A convenient laboratory, well equipped with all sorts of physical apparatus, with a machine-shop with all necessary machine tools and extremely competent instrument-makers, together with a staff whose chief interest and duty have always been the performance of research, furnish the necessary means; the spirit of the times, together with that enthusiasm for research which it has always been the purpose of the Department to inculcate, may be relied upon to furnish the driving power.

The subject of Ballistics, which may be defined as that of throwing a projectile so as to hit a previously designated target, demands a very great amount of knowledge of Theoretical Mechanics, of which Ballistics is a small part, as well as of Experimental Physics, of which Mechanics is a small part. It is thus evident that, although Ballistics, like the larger subject of Physics, is an experimental science, its application demands a large amount of pure mathematics. Professor Webster's lectures on Theoretical Dynamics and on Partial Differential Equations have furnished the necessary preparation for theoretical work.

The subject of Interior Ballistics is an application of Thermodynamics, as well as of Elasticity and of the Dynamics of Rigid Bodies, while the Ballistics of Penetration requires mathematics of a very difficult order.

The program laid down comprises the determination of short intervals of time and the measurement of velocities of projectiles both outside and inside the gun, the recording of pressures within the gun, the vibrations of guns, the question of jump and whip, the photography of the air wave accompanying the projectile, the study of air resistance, the development of a new instrument for drawing trajectories, the applications of the gyroscope, the elastic properties of steel, and many other questions which every expert ballistician can readily suggest. It is not intended that all work shall be confined within the walls of the laboratory, but that it shall be carried, when necessary, to the external range or proving ground. Permission has been obtained to use the State Rifle Range at Shrewsbury, and an invitation has been already received to apply the first successful practical development, that of an indicator, which does for the gun what Watt's indicator does for steam and gas engines, to a large gun at the Army Proving Ground at Aberdeen, Maryland. The chief authority on ballistics in France last summer declared that ballisticians had been waiting for this instrument for fifty years. A further practical result is the gun-sight for anti-aircraft guns invented by Dr. Thompson, which is now in the hands of the Army, as well as the most accurate method in existence for measuring the velocity of a projectile. The last two inventions derive directly from Dr. Webster's long researches in acoustics.

To those who inquire the need for such an institute after the war, the answer may be made that the principles of physics and mathematics utilized in ballistics are of equal importance in peace or war, and that any results contributed to the subject of ballistics must inevitably help in the prosecution of all wars. The country is well awake to-day to the enormous advantage that has accrued to the Germans in the possession of a large number of scientific men thoroughly trained to methods of research. An examination of the literature of the war will show that in research this country is painfully behind. It is no reflection on the officers of our splendid Army and Navy to say that, however capable they may be, they have not up to the present moment been offered the theoretical training that should be considered necessary in the very difficult art of Ballistics or that is offered to French, Italian or German officers. As a matter of fact, so far as known, there exists at present in the whole world but one institution of the breadth here contemplated, namely the Ballistisches Institut at Charlottenburg, Berlin, presided over by Prof. Carl Cranz, whose treatise on the subject of

Ballistics is classical, as his laboratory is unapproached. It is with the patriotic aim of giving to this country something of the same sort, even if very modest in size, that the present plan has been arrived at. Fortunately sufficient funds for the first year were secured, from the National Academy of Sciences, the American Academy of Sciences, the Naval Consulting Board of the United States, and from a great arms company, so that it is certain that results of value will be obtained. It is perfectly obvious that the amount of work that can be undertaken will be in proportion to the money that can be secured. This statement is made in the hope that more money will be forthcoming in order to engage more physicists, who are daily becoming a more and more scarce commodity. This year, from lack of funds, it has been necessary to seriously reduce the staff.

There has already been collected, in a very short time, a library on the subject of Ballistics which is probably not surpassed for quality in the United States. Every endeavor will be made to acquire every work of importance on the subject in any language so far as it may be obtained.

Staff

ARTHUR GORDON WEBSTER, PH.D., Sc.D., LL.D., Director.
LOUIS TEN EYCK THOMPSON, PH.D., First Assistant.
ELMER A. HARRINGTON, PH.D., Assistant.
KELLY MILLER, JR., A.M., Assistant.
CLARENCE N. HICKMAN, A.M., Assistant.
NILS RIFFOLT, Instrument Maker and Assistant.
CARL BJORKMAN, Machinist.

Lectures have been given, and may be expected from time to time, on the following subjects:

25. EXTERIOR BALLISTICS, INCLUDING HIGH ANGLE FIRING.
26. INTERIOR BALLISTICS, THEORETICAL AND PRACTICAL.
27. THEORY OF AVIATION.
28. THE APPLICATIONS OF THE GYROSCOPE, INCLUDING BALLISTICS.

In the library Clark University has one of its strongest features. With a large separate building, administered in the most liberal manner with a view to the advantage of the research student, and with ample funds for the purchase of books, its facilities in the Department of Physics can hardly be surpassed. It may be said to contain all of the most important works in many languages, and is continually kept up-to-date, any book wanted needing only to be mentioned to be procured. The library is particularly rich in journals, among which are included the transactions of the learned societies of England, France, Germany, Italy, Austria, Holland, and Belgium. Other sets are being continually added. A list of journals will be found on pages 51–56. There are few subjects connected with physics which may not be thoroughly studied in this library.

III. CHEMISTRY

It is the purpose of the Department of Chemistry to provide the student with that broad training in the fundamental principles of chemistry which shall adequately equip him for a subsequent scientific career.

A considerable proportion of the students entering this Department naturally look forward to an academic career. It is not intended, however, to provide training for such men alone; for the equipment for technical research, whether for public or private interests, requires equally a thorough familiarity with the fundamental underlying principles of science and with the methods of experimental investigation.

Whether a student shall devote himself to pure or to technical research is a matter of individual interest and inclination rather than of training. The purpose of the Department is to provide the training on lines sufficiently broad to enable the student to exercise a choice between technical and purely scientific work.

REQUIREMENTS

In addition to the formal requirements for entrance to the University, the student entering the Department of Chemistry should have a thorough knowledge of the fundamentals of chemistry, including general chemistry, qualitative and quantitative analysis, organic chemistry, and the elements of physical chemistry. The student should also have had mathematics through the elements of the calculus, and not less than two years' work in physics, including general physics, the elements of thermodynamics with labo-

ratory work in heat, and the elements of the theory of electricity and magnetism with laboratory work in electrical measurements.

Students entering this Department, who have not had the work in both physics and mathematics as outlined above, are required to make up the deficiency during their first year. Excellent courses in these subjects, which are open to University students, are offered in the College. Students whose training in chemistry falls below the requirements as above outlined, but who have had more extended courses in physics and mathematics may be allowed to enter the Department on condition that any deficiencies in chemistry will be made up during the first year.

A reading knowledge of French and German is indispensable for advanced work in chemistry.

Students who have done graduate work in other universities may enter the Department of Chemistry, receiving credit for residence (excepting the last year), provided the work done has been of such character as to provide the student with the necessary training.

INSTRUCTION

In order that a student may receive a broad training in chemistry, it is necessary that his time be properly distributed between class room work, research work, and library work. The Department endeavors, therefore, to keep the student occupied with these three lines of effort, without exclusion of one or more of them.

The following courses of instruction are offered:

1. THEORETICAL CHEMISTRY I. Dr. Kraus. Lectures, conferences and problems. After developing the fundamental conceptions of thermodynamics, a study is made of systems comprising phases of constant composition. This is followed with a study of gaseous equilibria and

heterogeneous equilibria in systems comprising phases of constant composition.

2. Theoretical Chemistry II. Dr. Kraus. A continuation of the preceding course. The Nernst Heat Theorem is first examined together with allied matters. This is followed by a study of equilibria in systems comprising any number of phases of variable composition including electrolytic solutions. This course extends over two years.

3. Inorganic Chemistry. Dr. Kraus. This course consists of conferences in which the various elements and their compounds are discussed. The students are given numerous references to the literature. It is intended here to familiarize the student with the properties of matter in its more important forms and to bring his knowledge down to that of the current literature. Both physical and chemical properties are considered. This course thus becomes supplementary to the two preceding ones. It extends over three years.

4. The Phase Rule. Dr. Kraus. Conferences with references to the literature. A study is made of one, two and three component systems including both metallic and non-metallic substances.

5. Dispersed Systems. Dr. Kraus. Conferences with references to the literature. This course is devoted to the study of colloids and of surface phenomena in general.

6. Photochemistry. Dr. Kraus. Lectures and conferences. A study is made of the influence of radiations on chemical reactions.

7. The Process of Electrical Conduction. Dr. Kraus. Lectures and conferences. A detailed study is made of the conduction process in gases, electrolytic solutions, fused salts and metals.

8. Properties of Radioactive Elements. Dr. Kraus. Lectures and conferences. This course is devoted to a study of radioactive substances and the radiations accompanying their transformations.

9. History of Chemistry. Dr. Merigold. A course of lectures accompanied by supplementary reading. This course is intended to cover the historical development of the science in both practical and theoretical aspects. An attempt is made to give the student some knowledge of the individuality of the men whose work has resulted in the growth and development of modern chemistry. Attention will be given also to the relation of chemistry to other sciences at various periods of development.

10. Advanced Analytical Chemistry. Dr. Merigold. In this course will be considered special features of analytical chemistry, both practical and theoretical. The work will include such topics as special analytical methods with particular reference to sources of error, limits

of accuracy, and theoretical considerations; methods of exact analysis required in atomic weight work and other fields of research necessitating precise analysis. Particular attention is paid to results of recent investigation in this field.

11. ORGANIC CHEMISTRY. Dr. White. Conferences are held at which the fundamental conceptions and problems of organic chemistry are dealt with in a systematic way. Current literature, applicable to the subjects under discussion, is reviewed.

12. RESEARCH CONFERENCE. Dr. Kraus. This course is devoted mainly to a discussion of investigations which are being carried out in this laboratory.

Courses 1, 2, 3, 4, 7, 11, and 12 are given during the present year. (Courses 1, 2, 3, 5, 8, 9, 11 and 12 will be given during the year 1920–1921.)

MINOR SUBJECT. Students choosing chemistry as major subject are expected to take a minor in mathematics, physics, or biology. The choice of a minor subject will be made with reference to the student's previous preparation and to his ultimate aims as an investigator.

RESEARCH. In order that the student may become familiar with the methods of research and gain a knowledge of the minute details of one or more branches of chemistry he will carry on one or more researches throughout his three years of residence. Such researches will in all cases be in part experimental in nature. The subject for research may be one suggested by the student or one suggested by the instructor. In any case, the different investigations carried on in the laboratory at any one time will be largely diversified in order that the students may come into intimate contact with as many branches of chemistry as possible.

Since the student's early investigations will in all likelihood be more or less determinative of the subsequent trend of his scientific activities, his subject for research is chosen with much care and, if possible, he is given several subjects during the course of his three years' work in the laboratory. In addition he is expected to make himself thoroughly familiar with the details of the investigations of his fellows in the laboratory.

LIBRARY WORK. It is essential that the student shall acquire an adequate contemporaneous knowledge of the entire field of chemistry. This can be done only by reference to the original literature, both past and current. He is expected, therefore, to devote a considerable portion of his time to familiarizing himself with the journals, periodicals, and other important sources of information available in the Library. The various courses are given in such manner as to lead the student on in this direction.

FACILITIES

LABORATORIES. The main laboratories of the Department occupy the third floor of one wing of the Science building. The floors below are occupied by the Collegiate Department of Chemistry. In addition the Department occupies several laboratories in the basement of the Main Building. Altogether, facilities are available for approximately twelve men.

The Department is provided with a shop which is fully equipped for carrying out any mechanical work which is necessary in connection with the various investigations, and the services of a skilled mechanic are available.

The Department also has a very complete equipment of various physical and physical-chemical apparatus to be used in research work and a large supply of materials of all kinds.

In addition to the equipment of permanent apparatus which is available, the Department is always ready to purchase special equipment or material as required for research work.

THE LIBRARY. The library facilities which the University affords to students in chemistry are the best obtainable. Complete sets of journals and periodicals are kept on file, together with text books, treatises, etc. New books are placed on display on the library tables and such as are of value are ordered on request.

The student has free access to the shelves and files. Tables are assigned in proximity to the book shelves where the student may leave permanently books and papers with which he is engaged. A more detailed description of the library facilities will be found elsewhere.

SCHOLARSHIPS AND FELLOWSHIPS

A considerable number of scholarships and fellowships are available for students in this Department under conditions set forth elsewhere.

DOCENTS AND HONORARY FELLOWS

Docents and Honorary Fellows are appointed under the conditions as set forth elsewhere. The Department welcomes such men as have already obtained their Doctor's degree and who for one reason or another wish to devote themselves for some time to research work. Every facility and encouragement will be afforded such men for the furtherance of their work.

DEGREES

MASTER OF ARTS. The formal requirements for this degree do not necessarily include an original investigation on the part of the candidate. However, the candidate must demonstrate that he possesses a working knowledge of the fundamental elements of the Science of Chemistry. Obviously, in the case of a science so largely founded on experimental facts as is chemistry, the power to carry on an experimental investigation constitutes one of the most simple and direct means for demonstrating that the candidate possesses the necessary scientific qualifications for this degree.

DOCTOR OF PHILOSOPHY. The formal requirements for this degree are given elsewhere. Among other things, they include three years of residence (or its equivalent in other institutions), with attendance on lectures, and the successful completion of an investigation which constitutes a contribution to the Science of Chemistry. The requirements for a degree cannot, however, be fulfilled by merely observing the formal requirements as to residence, attendance on lectures, and the like. On the contrary, while all formal requirements must be scrupulously fulfilled, to receive the degree of Doctor of Philosophy, the candidate must clearly demonstrate that he possesses those scientific attainments which are essential to an active and productive scientific career.

IV. BIOLOGY

The work of the biological department has reference chiefly to the problems of general physiology, *i.e.*, problems dealing with or bearing upon the peculiarities of vital processes as such. In modern physiology living organisms are regarded as material systems having special and highly distinctive characteristics which are subject to analysis by the methods of the exact sciences. The problems presented by the living cell—a system consisting largely of colloidal material and distinguished by the possession of metabolism and other unique peculiarities—are most effectively approached from this point of view, and fundamental progress in general physiology has been due chiefly to the application of the sciences of physics, chemistry and physical chemistry to the analysis of the vital processes. The biological department offers instruction and facilities to those interested in the application of the physical and chemical sciences to the problems of general physiology. Students and investigators in this field will find unusually good opportunities for gaining the requisite knowledge of physics, chemistry and especially physical chemistry, and every effort will be made to correlate their work in these departments with their physiological work. Students of the physiological analysis of the reactions and behavior of normal intact organism are offered the further advantage of coöperation with the department of psychology. Work in the physiology of development, comparative physiology, general pharmacology and other fields of research in which marine animals are especially valuable may be conducted during the summer at the Marine Biological Laboratory at Woods Hole under the direction of Professor Lillie.

The laboratory is equipped with the usual apparatus and materials for work in general physiology. Any additional apparatus, animals or chemical reagents required for the purposes of any special research will be provided wherever possible. The conditions are especially favorable with regard to scientific literature. Complete files of nearly all of the important journals in zoölogy, physiology and biological chemistry are in the library, as well as a large number of special works in these sciences, and literature in other biological fields (botany, medicine) can be procured on short notice.

For admission to the laboratory students should have had adequate previous training in biology, chemistry and physics. Resident men students whose preparation in these subjects is insufficient may remove these deficiencies by taking the courses offered in Clark College. Students desiring to attend lecture courses without taking laboratory work can make special arrangements to do so.

The following courses are offered:

1. FUNDAMENTAL PROBLEMS OF GENERAL PHYSIOLOGY. This course is introductory and will deal chiefly with the physiology of the living cell from a physico-chemical point of view. The subject matter will be divided somewhat as follows: The distinctive characteristics of living as distinguished from non-living matter; chemical composition of the cell; enzyme action; the physico-chemical constitution of the cell; the nature and significance of cell-organization; the importance of the colloidal state in physiological processes; the rôle of electrolytes; the physiology of stimulation, contractility, and related processes; the general reactions and elementary behavior of intact organisms (tropisms, etc.); the general characteristics of metabolic processes (oxidations, syntheses, interchange with surroundings); cell-reproduction, fertilization, development and heredity. DR. LILLIE, *two lectures weekly, October to June.* Students with sufficient preparation will be assigned laboratory work in connection with these topics.

2. SPECIAL PROBLEMS OF GENERAL PHYSIOLOGY. A more advanced course of lectures will be given on topics of general physiology, having

especial reference to the problems under investigation in the laboratory. Hours will be arranged to suit requirements. DR. LILLIE, *October to June.*

3. BIOLOGICAL SEMINAR. The Seminar will meet once a fortnight to present results of research and to review and discuss recent literature. *October to May.*

4. SPECIAL TOPICS IN BIOLOGICAL CHEMISTRY. The aim of this course is to present in greater detail than is usually possible in a more general course, certain subjects of particular interest to students intending to undertake biochemical research. The subject at present offered is organic chemistry with especial reference to compounds and processes of biological interest. The discussions will include the physical and chemical properties of such compounds, their metabolism, and general physiological significance. DR. WHITE. *One lecture weekly, October to June.*

5. THE PHYSIOLOGY OF MARINE ORGANISMS. The course in General and Comparative Physiology, given in the summer at the Marine Biological Laboratory at Woods Hole under the direction of Dr. Lillie, is also open to properly qualified students in Clark University. Those prepared to do so may undertake research in this field. For further information regarding the work at Woods Hole students are referred to the Annual Announcement of the Marine Biological Laboratory.

V. PSYCHOLOGY

A complete course in Psychology at Clark University includes the following subjects:

1. Anatomy and Physiology of the Brain and Spinal Cord, sense organs, and other parts of the body, including the muscles—the organs of the will—in so far as they are concerned with mental processes—together with a good general background of biology.

2. Physiological and Experimental Psychology, including the elementary sense-experiences; sensation and perception; the measurement of sensational intensity; space; time; reaction-times; affection and emotion; memory; association; attention; action; thought; the complex mental processes; inter-relation of mind and body. For this a special laboratory is equipped.

3. Comparative and Genetic Psychology. Review of the general doctrine of evolution as a basis for the evolution of mind. Discussion of experimental and observational studies upon typical forms of animal life, beginning with the protozoa. Instincts; animal and human infancy. Childhood and adolescence.

4. Abnormal and Morbid Psychology, as nature's experiments, *e.g.*, border-line phenomena as seen in neurotic subjects, prodigies, and geniuses; defectives, such as the blind, deaf, criminal, idiotic; mental and nervous diseases, epilepsy, phobias, neurasthenia, hysteria; morbid modifications of will, personality and emotion, etc. Special clinical facilities for this work are open to the department in the hospitals and other institutions of the city.

5. History of Psychology and Philosophy, including the chief culture institutions, history of science, medical theories, Christianity, and education generally.

6. Applications of Psychology, Pedagogy, including mental and moral hygiene and regimen, school organization and methods from kindergarten to university; the sex problem; defectives, etc.

7. Psychoanalysis. Freud, Janet, Jung, Adler and others. The mechanisms are considered less in their applications to sex than to fear,

anger and other emotions. The psychoanalysis of great men. Dreams, hypnotism, multiple personality, somnambulism, and the more common forms of neuroses and psychoses, the psychology of everyday life.

8. Every two years a course is given in the psychological implications of digestion, beginning with the Pawlow school and tracing the effects of food and drink on psychic processes.

9. A course of one hour a week is given on the psychology of war in general and especially of the recent war.

The aim of the Psychological Department is to cover this field as well as its instructors are able to do in two or three years.

The following courses are announced for the academic year 1920–1921.

DR. HALL'S COURSES

Dr. Hall's courses are as follows:

1. THE PSYCHOLOGY OF THE FEELINGS AND EMOTIONS. This course will involve a brief sketch of the history of the theories in this field and a much more extended account of the recent experimental, clinical and genetic work done in this domain. The purpose of the course is to give a clear account of the present condition of our knowledge of each of the feelings, one after another, pleasure and pain, fear, anger, sympathy, jealousy, love, hate, etc.

2. PSYCHOGENESIS. This course will begin with an account of the theories of the origin both of life and of mind, with chief emphasis upon the latter. There will be a survey of the results of experimental biology, concerning elemental life or substances that resemble it, then experiments and observations upon the simplest organisms. This will be followed by a résumé of our knowledge of certain typical forms of animal instinct up the series, and upon this basis the contributions of paleontology will be drawn upon and certain lessons as to the development of type forms of life and instinct; the horse, camel, monkey, and other typical forms will be dwelt upon at some length. This will be followed by a brief account of culture stages of the human race from the paleolithic age and that of the troglodytes up.

3. THE PSYCHOLOGY OF RELIGION. This falls into two halves:—first, the origin of religion, from animism and manaism up to the

ethnic religions other than the Hebrew and Christian; the latter, focussing in the psychology of Jesus, constituting part two.

4. THE PSYCHOLOGY OF APPETITE, Foods and Nutrition.

5. STUDIES IN HUMAN CHARACTER. This course begins with a consideration of current tests, scales, standards, and passes on to the higher qualities of man and the problems of race, sex, genius, talent, and the more or less systematic attempts that have been made to analyze and compare the original powers of man.

6. PSYCHOANALYSIS.

The above outlines indicate Dr. Hall's field, from which special topics will be selected for the courses of the following year. The whole field requires two or three years, but which of the topics will be stressed during the academic year 1920–1921 will depend somewhat upon the personnel of the psychological group.

7. THE SEMINARY, at Dr. Hall's house, three hours every Monday evening through the year. This seminary has been held nearly every Monday evening, when the University was in session, since its foundation. Each member of it is supposed during the year, to present one or more papers upon his thesis or upon some other approved topic, which is later discussed. This serves to pool the special studies of each student for the benefit of the others, while the discussions serve to develop interest and quicken thought.

8. Researches with individuals on special topics and personal conferences every afternoon.

EXPERIMENTAL PSYCHOLOGY

The primary purpose of this department is to train students for the investigation of psychological problems. The lecture courses aim to familiarize the student with the history and the present status of psychological experimentation; the laboratory courses are arranged with a view to training him in experimental procedure, and equipping him for independent research.

LABORATORY

The psychological laboratory occupies a suite of twenty rooms on the upper floor of the main building of the university. These rooms, as at present arranged, are devoted to the following purposes: lecture-room, journal-room with the departmental library, photographic dark-room, work-shop, drafting-room, offices, experimental dark-room, general apparatus-room, and rooms used for research purposes and devoted to the storage of apparatus respectively for vision, audition, taste and smell, the cutaneous and organic senses, attention and perception, and the complex mental processes.

The laboratory is well equipped with general apparatus; and it has an annual appropriation sufficient to provide for the purchase and manufacture of such apparatus as is required from time to time for special investigations. The workshop contains power- and other lathes, a power-drill, and an equipment of tools and materials for the manufacture and repair of apparatus. Every facility is provided for the devising and constructing of apparatus appropriate for the solution of such special problems as are undertaken.

The university library contains an unusually large collection of psychological literature. It is especially well supplied with scientific periodicals and reports of the proceedings of learned societies. Besides the material for related departments of knowledge the classification shows a list of seventy-five files of journals or other serials that are of strictly psychological nature. Since the enrolment of the department consists exclusively of graduate students, and is, therefore, relatively limited in numbers, it is possible to give to each student of the department a maximum of freedom in the use of the library. Besides having access to the university library, students of the laboratory have at their disposal a working-library of psychological books and periodicals which are shelved in the journal-room.

The more general and fundamental courses of lectures in the department are repeated every year, while the more advanced and specialized courses are given only in alternate years. A feature of the method of instruction at Clark

University is the frequent informal conferences between instructor and student. The laboratory work includes an introductory course, an experimental course in statistical methods, and a research course. The former is designed to familiarize the student with the efficient handling of apparatus, and to acquaint him with the methods to be followed and the precautions to be observed in psychological experimentation. Especial attention is given to training in the methods of introspection. This course is repeated every year; it, or its equivalent, is a prerequisite to all other work in the laboratory. The course in statistical methods deals with the use and significance of the various statistical and psychophysical procedures and is intended to train the student in a critical interpretation of quantitative data, in the planning of quantitative experiments, and in the treatment of data obtained in research. In addition to these fundamental laboratory courses, a course is offered in the technique of experimental psychology which aims to familiarize the student with the variety and use of various forms of psychological apparatus, the general principles involved in the construction of apparatus and with other forms of information and skill of a strictly psychological nature. Research is individualistic and varies from year to year.

Provision for Comparative Psychology is now made at the Hadwen Arboretum, about fifteen minutes' walk from the main building of the University, where special facilities for the care of the animals have been provided.

DR. BORING'S AND DR. FERNBERGER'S COURSES

1. Introductory Experimental Psychology. A course of lectures and demonstrations dealing with sensation, affection, attention, perception, memory, imagination and the more complex mental processes. This course will present, in concrete and systematic form, the more important facts that have been yielded by the experimental in-

vestigations of psychological problems. This course is offered to form a basis in the training of those students who have not previously had an elementary systematic foundation in experimental psychology. It, or an equivalent, is a necessary prerequisite to more advanced courses in the department. DR. FERNBERGER. *Two hours a week throughout the year.*

2. INTRODUCTORY PSYCHOLOGICAL LABORATORY. The purpose of the course is to familiarize the student at first hand with his own mental processes and to train him in the technique of psychological experimentation. He performs with a partner a series of standard psychological experiments. DR. BORING, DR. FERNBERGER, and MR. PRATT. *Four hours a week throughout the year.*

3. SYSTEMATIC PSYCHOLOGY: ELEMENTARY PROCESSES. A course of lectures and demonstrations dealing with sensation, feeling, the simple image, and attention. DR. BORING. *Three hours a week throughout the year.*

[4. SYSTEMATIC PSYCHOLOGY: COMPLEX PROCESSES. A course of lectures and demonstrations dealing with perception, association, memory, imagination, action, thought, and emotion. DR. BORING. *Three hours a week throughout the year.* Not given in 1920–21.]

Courses 3 and 4 together constitute a systematic survey of the field of experimental psychology. The courses are given alternate years so that the entire field is covered every two years. The courses presuppose a familiarity with the general content of systematic experimental psychology. When the student lacks this training he should precede the systematic courses by course 1. Under exceptional circumstances he may with profit take course 1 and the systematic courses simultaneously. The student should confer with Dr. Boring concerning his preparation before he undertakes these courses. The treatment within the courses is historical and critical. It aims to familiarize the student with the experimental researches that underlie psychological knowledge and to show how psychological fact is a function of experimental procedure.

[5. THE PSYCHOLOGY OF LEARNING. A course of lectures dealing with the phenomena of mental acquisition, retention and recall, imagery, association, reproduction, the phenomena of learning and forgetting, and the function and development of habits. DR. FERNBERGER. *One hour a week throughout the year.* Not given in 1920–21.]

6. THE APPLICATION OF STATISTICAL METHODS TO PSYCHOLOGY. A course of lectures and laboratory work dealing with the application of statistical methods to psychological material. The practice of the

psychophysical measurement methods, the distribution of relative frequencies, correlation and similar topics will be considered. The various topics will be discussed in lectures and the students will subsequently be required to collect data and apply the necessary calculations. Dr. Fernberger. *Two hours a week throughout the year.*

[7. The Neurological Basis of Psychology. An elementary course dealing with the anatomy and physiology of the central nervous system and the organs of special sense. The work will be covered partly by lectures and partly by actual dissection. The central nervous system will be considered from the functional aspect as well as from the point of view of gross and microscopic anatomy. Dr. Fernberger. *Two hours a week. Second semester.* Not given in 1920–21.]

8. Psychological Technique. The purpose of this course is to acquaint the student with the technique of the more complicated apparatus used in psychological experimentation and with information and procedures required by psychological investigators. The use of the apparatus for measuring bodily expression and of apparatus for the presentation of materials and the recording of responses will be given special attention. A review of the more important research pieces and methods in the various divisions of experimental psychology will be undertaken in lectures by charts and by reference to the literature. The important pieces of apparatus in the possession of the laboratory will be demonstrated and the student trained in their actual use so far as time permits. Attention will be given to the use of the work-shop and practical methods of constructing apparatus; and to a limited extent the student will be given an opportunity for the acquisition of skill in certain essential processes of the shop. A few lectures on the use of the library and on bibliographical methods will be included. The course is intended solely for students who expect to make psychological research their profession. Dr. Boring and Dr. Fernberger. *Two hours a week throughout the year.*

9. Research in Experimental Psychology. Experimental investigations under the direction of the laboratory staff. *Topics and hours to be arranged.*

DR. KARLSON'S COURSES

1. History of Philosophy. The work in philosophy at Clark University is essentially limited to a thorough, though introductory, course, including lectures and texts covering the entire history of philosophy

from Thales to Schopenhauer, both inclusive, as fully as can be done in two hours a week. The instructor makes no attempt to teach systematic philosophy, logic, ethics, metaphysics, psychology, or any of the special disciplines, and deals with the history of philosophy in the sense of Zeller, Fischer, Ueberweg, and the rest, in the historic spirit, with some biographical matter, teaching the chief opinions of each important man and then passing to another, and not stressing any of the above specialties. The idea is that the historian should be metaphysician, logician, ethicist, epistemologist, psychologist, etc., just as much as was the man whose system he is expounding for the time, chiefly finishing one author before passing to another, following largely the chronological order, and teaching each system more as literature than as dogma, avoiding indoctrination, and teaching every doctrine or view sympathetically, letting the systems criticize each other, and in general reserving his own criticisms until after his sympathetic presentation has been made, and striving to fit for our examination in such a way that we can plan ultimately to require this course of all who take degrees in psychology or education. *Two hours a week.*

2. CONTEMPORARY PHILOSOPHY. A discussion of the philosophy since Schopenhauer, dealing chiefly with the Naturalistic, the Idealistic, the Pragmatic, and the Realistic tendencies in present day philosophy. Special emphasis is laid on the philosophy of such men as Haeckel, Nietzsche, Eucken, James, Bergson, etc., and an evaluation of their philosophy is attempted. The relation between philosophy and present day science is also discussed. *One hour a week.*

DR. PORTER'S COURSES

COURSE IN MENTAL EVOLUTION AND COMPARATIVE PSYCHOLOGY. Lectures on reflexes, tropisms, instincts, habit-formation, the learning process, and other mental processes in animals. Especial emphasis will be placed on methods of experimental investigation and interpretation of results. The facts and laws of animal behavior and the relation of these to the various branches of human psychology, and other social sciences will be discussed. Some attention will be given to the applications of the findings of the study of Animal Behavior to Nature Study. Lantern slides, charts and demonstrations with apparatus with animals and human subjects. *One hour a week. First semester.*

COURSE IN SOCIAL PSYCHOLOGY. Discussions of the rapidly increasing contributions to our knowledge of reflexes, instincts, and conditions of learning in so far as these explain and point to the practical control of social forces and institutions. The results of investigations of individual, comparative, applied, and social psychology are made to contribute to the understanding of the behavior of the individual when he is a member of a group. The chief sources used are: Thorndike's Original Nature of Man; McDougall's Social Psychology; Wallas' The Great Society; Ross' Social Psychology, and Trotter's Herd Instinct in Peace and War. *One hour a week.*

DR. GEISSLER'S COURSES

Psychological Practicum. Experimental demonstrations and practical exercises in the conduct of the most widely employed mental and physical tests and in the application of general intelligence scales after Binet, Goddard, Terman, Yerkes, and others, and of some of the most important educational scales and measurements; discussion of and practice in the mathematical treatment of data obtained by these methods. *One hour a week.*

Systematic Applied Psychology. A systematic survey of the applications of psychology to various lines of human activity and a critical evaluation of the main results thus far obtained. The following topics are emphasized: Character study, Individual Differences, Personnel Analysis, Clinical psychology, environmental influences, moral delinquency, the human element in business and industry. *Two hours a week.*

The following courses offered by Professors James P. Porter and L. R. Geissler in Clark College are open to men students in the University:

1. General Psychology. Three hours a week, throughout the year
2. Social Psychology. Three hours a week, throughout the year.
3. Educational Psychology. Three hours a week, throughout the year.
4. Laboratory Course in Experimental Psychology. Three hours a week, throughout the year.
5. Advanced Psychology. Attention, feeling, emotions and will. A lecture and seminar course. Three hours, throughout the year.

At the Hadwen Arboretum, where a "station for the study of animal behavior" has been established and is now under

Dr. Porter's direction, are found facilities for the study of certain forms of animal life; and here too will be found some of the illustrative material for his lectures.

PSYCHIATRY

Up to the present year the University has always provided a clinical course at the Worcester State Hospital for the Insane in pathological psychology. Since the death of Dr. Edward Cowles, however, no provision has been made for work in this field, but it is hoped that this vacancy will soon be filled and an announcement later made.

VI. PEDAGOGY

This department offers a course which can be taken for the degree of Doctor of Philosophy. Its work is in the closest connection with that of psychology and anthropology, and in part based on these subjects. The work in this department is intended to meet the needs of the following classes of students.

First. Those intending to teach some other specialty but who wish a general survey of the history, present state, methods, and recent advances in the field of university, professional and technical education.

Second. Those who desire to become professors of pedagogy, or heads or instructors in normal schools, superintendents, or otherwise to become experts in the work of education.

The program of the Pedagogical Department includes courses or part-courses upon the following subjects:

1. (*a*) CHILD STUDY. (*b*) PEDAGOGICAL PSYCHOLOGY. (*c*) EXPERIMENTAL PEDAGOGY. (*d*) SCHOOL HYGIENE.

2. (*a*) PRINCIPLES OF EDUCATION. (*b*) HISTORY OF EDUCATION AND REFORMS. (*c*) METHODS, DEVICES, APPARATUS, ETC.

3. (*a*) ORGANIZATION OF SCHOOLS IN DIFFERENT COUNTRIES. (*b*) PROBLEMS OF COLLEGE EDUCATION. (*c*) THE TEACHING PROFESSION. (*d*) MOTOR EDUCATION, including manual training, physical education, etc. (*e*) MORAL AND RELIGIOUS EDUCATION. (*f*) IDEALS.

The courses in pedagogy for 1920–21 will be as follows:

DR. WILLIAM H. BURNHAM'S COURSES

A. THE HYGIENE OF INSTRUCTION AND THE PRINCIPLES OF MENTAL HYGIENE. The significance of stimulation in the development of the nervous system. The development of associated stimuli and conditioned reflexes. The conditions of efficient brain activity. The general principles of mental hygiene. The effects of drug stimuli, alcohol, tobacco, caffeine and the like. Fatigue. The period of study. Recesses. The optimum conditions of school work. The hygienic aspects of examinations, discipline and punishment. The relations of discipline to mental hygiene. The hygiene of different subjects of school instruction. *One hour a week throughout the year.*

B. THE TEACHING PROFESSION. Teaching as trade or learned profession. The evolution of the teacher's calling. The teaching body as a social group in relation to other economic and social groups. The social function of the teacher. Salaries and social conditions. Characteristics of the teaching body as a social group. The teacher and the parent. The teacher and the artisan. The teacher in the countries of antiquity, in China, India, Greece, Rome, etc. The medieval teacher. The teachers of the early Renaissance. The great schoolmasters of the Reformation. The reformers, Comenius, F. A. Wolfe, Pestalozzi, et al. The teaching profession in Germany. Fundamental principles concerning the training of teachers. The normal schools. The hygiene of teaching. *Once a week, throughout the year.*

C. SEMINARY. The work will be determined in part by the needs of the students who elect this course. It is hoped that each student will select, after consultation with President Hall and Dr. Burnham, a topic for special investigation. The results of such studies may be published. *One or two hours a week, throughout the year.*

DR. EDMUND C. SANFORD'S COURSES

During the year 1918–19 no lectures were delivered by Dr. Sanford. For 1919–20 his topic is the History of Science. Under this title it is planned to discuss the general social and other conditions which in the past have favored or retarded progress in science, to note the most important advances made and the characteristics of the men who have made them, and finally to draw such inferences as may be permissible with reference to the policies which should be followed by governments and institutions of higher education in attempting to secure still further gains.

The courses as announced above may be modified somewhat as the needs of the students or other circumstances may require.

THE CHILDREN'S INSTITUTE

The Children's Institute, under the auspices of the Educational Department of Clark University, provides lectures in the small lecture-room on the second floor of the new wing of the library building, from nine to ten o'clock on Saturday mornings, open not only to students but to all others interested. This work varies from year to year.

The Children's Institute had a large hall with three adjacent rooms, comprising one entire floor in the new Library Building devoted to an educational museum, which is equipped with hundreds of maps, charts, diagrams, illustrative and other apparatus gathered from many countries, to ease the work of teaching and make it more effective. This material is used in various departments, but especially by that of Education.

Special attention has been given to the collection of the circulars and other publications of nearly one hundred types of child welfare organizations with which the department seeks to keep in touch.

THE LIBRARY

The library of the department has a large collection of EDUCATIONAL LITERATURE, being especially rich in German and French literature, and having a large number of official reports from various countries—English, French, German, Belgian, Swedish, etc.; also town and city reports, and reports of special institutions; and a collection of French, German, and American text-books.

The books are arranged under the following heads:

1. GENERAL.
2. HISTORY OF EDUCATION.
3. EDUCATIONAL SYSTEMS.
4. THE THEORY OF EDUCATION AND SPECIAL SCHOOL SUBJECTS.

5. EDUCATIONAL PSYCHOLOGY.
6. CHILD STUDY.
7. SCHOOL HYGIENE AND PHYSICAL EDUCATION.
8. TEXT-BOOKS.
9. MISCELLANEOUS.

Many of the more common educational books are accessible in the Worcester Public Library and have not been duplicated by the University. The large collection of educational text-books in the library of the American Antiquarian Society and its valuable historical material are also accessible to the University.

The collection of educational periodicals includes a large number of the best foreign journals—English, French, German, Swedish, etc.

THE EDUCATIONAL MUSEUM

The nucleus of an educational museum has been formed. This is now merged with the museum of the Children's Institute, and contains a valuable collection of educational apparatus, pictures, illustrative material for language lessons, *Anschauungsunterricht*, toys, kindergarten material, maps, charts, diagrams, text-books, lantern slides, photographs, and illustrative material of various kinds in school hygiene, history, arithmetic, language, the natural sciences, etc. One room contains a collection of apparatus for the teaching of arithmetic, abacuses of various kinds, charts for counting, reckoning machines, number tablets, weights, measures, geometrical models, and astronomical charts and apparatus. Another room contains a collection of toys from different countries, a number illustrating scientific principles in physics and the like. A third room is devoted to apparatus and illustrative material in school hygiene. The collection includes seats and desks, charts illustrating good and bad posture, hygrometers, apparatus for ensuring cleanliness, for testing the air, charts illustrating the incidence of school diseases, the effects of antitoxins, etc., and a sample collection of the antitoxins for the various diseases. The main room is largely filled with pictures, models, maps, charts, and illustrative material for teaching the different school subjects and the different sciences. The catalogue of the department of school hygiene in the museum has been published. A catalogue of the toys has been prepared but not yet published. Recent important additions to the Museum includes samples of the latest hygienic seats and desks made under the direction of the Posture League; and the set of over 50 charts on School Health in the United States prepared by the Committee on School Health of the National Council of Education and the American Medical Association. Many charts, lantern slides and books have been loaned to teachers and others. This Museum is open to teachers, students, and the general public at definite times. It is now under the direction of Professor W. H. Burnham.

The *Pedagogical Seminary*, a journal issued at the University, serves as a convenient medium of publication for special investigations undertaken in the department.

VII. SOCIOLOGY

The courses of the Department of Sociology are designed primarily for those who plan to engage in teaching the subject or in some phase of sociological research or practical social work. Besides a general historical survey of social theories and a critique of certain major principles of sociological interpretation, chief attention is given to an analytical study of fundamental problems and methods of approaching them. Especial attention is given to quantitative methods of study as supplying the best training for social investigation and the most effective means for displacing opinion with fact in controverted matters.

The courses outlined below indicate the scope and nature of the work offered. A major for the Ph.D. degree may be taken in this department; the required minor may be taken in Psychology, History, or Pedagogy according to the interests of the student.

Dr. Hankins offers the following courses:

1. History of Social Theories. A survey of the main contributions to sociological literature beginning with Auguste Comte. A partial list of the writers covered in 1919–20 is: Comte, Quetelet, Buckle, Bagehot, Spencer, Novicow, Worms, Kidd, de Greef, Gumplowicz, Kropotkin, Oppenheimer, Small, Ratzenhofer, Ward, Giddings, Durkheim, Sumner, Boas, Ross, Cooley, and McDougall. Attention was given to the contributions of modern biology, of anthropogeography, and of the economic determinists. Each author is taken up in turn and his viewpoints and principles analyzed and discussed. *Two hours per week.*

2. General Sociology. A series of lectures dealing with social origins and evolution and sociological analysis. Topics treated include the origin of man, of races, and of society; primitive ideas; religion, its

origin, evolution and function; the family; tribal society; the state; philosophies of history. The analysis of social factors treats the physiographic, biological, economic and psychological bases of society and such special processes as natural and artificial selection; communication; coöperation; competition; differentiation; socialization. *One hour per week.*

3. PROBLEMS OF POPULATION. Considers various laws of population as developed by Malthus, Spencer, Nitti and others; vital statistics, birth and death rates, heredity and selection with some attention to statistical methods; theories of racial decay; eugenics and race-regeneration; and biological and sociological conditions affecting the supply of genius. Lectures, reports, discussions. *One hour per week.*

4. NATURE VERSUS NURTURE. Questions of social policy frequently resolve themselves into opinions as to the relative importance of biological and environmental factors in the life of individual or group. This course begins with an analysis of the matter and methods of the works of Galton and Pearson and the contrasted works of Ward and others. There follows a survey of investigations in the mental measurements of groups and races, and such studies of social life—child mortality, poor relief, crime and delinquency, alcoholism, etc.—as may throw some light on the respective parts played by inheritance on the one hand and social custom and training on the other. *One hour per week.*

5. PROBLEMS OF SOCIAL RECONSTRUCTION. The development of the philosophy of individualism and *laissez-faire* as related to its historical conditions is sketched, its statement by Smith, Bentham, Mill and Spencer is analyzed, and its bearings and limitations considered. A discussion of the theories of justice is followed by a treatment of various special problems, such as minimum wage, unemployment, and the distribution of wealth and income, and the basis and limitations of the movement toward collectivism. *One hour per week.*

6. ELEMENTS OF STATISTICAL METHOD. A course designed to familiarize the student with present methods of handling quantitative data in social science with special reference to various kinds of averages, and measures of dispersion and of correlation. *Two hours per week.*

7. SEMINAR. Given to reports on theses and selected portions of the current literature. Special attention is given to the periodical literature dealing with population questions or with some phase of sociological inquiry. *One hour per week.*

During 1919–20 courses 1, 4, and 5 are given; for 1920–21 courses 2, 3, and 6 will probably be offered.

Dr. Fisher offers the following courses:

1. Principles of Economics. This course presupposes a knowledge of economics such as that gained in a general college course. It consists in a critical study of such fundamentals as price, interest, rent, wages and profits. An intensive study is made of the writings of Marshall and of Davenport as representatives of antagonistic points of view. Readings, discussions, lectures and reports. *One hour a week, throughout the year.*

2. Money and Banking. This course consists in a brief study of the principles of money, followed by a comparison of the banking institutions of the United States and those of Canada and of Europe. The emphasis of the work is placed upon a study of the Federal Reserve System of the United States. *Two hours a week, throughout the year.*

Course 1 is being given in 1919–20.

VIII

HISTORY AND INTERNATIONAL RELATIONS

The distinctive feature of the Department is the emphasis it places upon the various aspects of international relations. Without neglecting scholarly investigation in the economic, political and social life of preceding centuries, it seeks to know the past primarily in order to understand the present; to learn from a study of their historical evolution how the various nations and races have developed the characteristics and culture which mark them today; to gain a sympathetic appreciation of the best in other civilizations; and to evaluate correctly the problems and the difficulties constantly arising in the international relations and diplomacy of the family of states. The field of history covered is not limited to the United States and three or four of the older nations of Europe, but includes as well the newer and rapidly developing states of Asia, Latin-America and Africa. Political development is regarded as of no greater importance than economic, diplomatic, and social advance.

ANNUAL HISTORICAL CONFERENCES

In carrying out these features of its work, the Department has arranged occasional conferences for the discussion of the history and the international relations of various lands. In 1909 the sessions dealt with the Far East, including China, India, the Philippines and Hawaii; in 1910, the Near East and Africa; in 1911, Japan and Japanese-American relations; in 1912, Recent Developments in China; in 1913, Latin America; and in 1915, the Problems

and Lessons of the World War. Altogether more than one hundred and seventy-five men have taken part in these conferences—university professors, anthropologists, leading natives, government officials, officers of the army and navy, travelers and missionaries—all of whom could speak with authority. The University students are enabled not merely to read the addresses and papers, which are issued in a series of bound volumes, but to listen to and meet these men who are both writing and making present-day history.

JOURNAL OF INTERNATIONAL RELATIONS

The *Journal of International Relations* is another means for emphasizing present historical values. Published quarterly by the University, under the editorship of President G. Stanley Hall and Professor Blakeslee, assisted by a board of twenty-four contributing editors, the majority of them from the faculties of other Institutions, it is a forum for the discussion of the problems which relate to the international relations of states. The *Journal* is of frequent service to the work of the Department, for it publishes from time to time articles and theses of advanced students, which show particular excellence.

FELLOWSHIP IN AMERICAN HISTORY

A Fellowship in American History will be awarded for the academic year, 1920–21, to be known as the American Antiquarian Society Fellowship. This has been established by members of the American Antiquarian Society, and will have a value of four hundred dollars in addition to remission of tuition fees.

The subject of research chosen by the Fellow for his Doctor's thesis should lie within the field of American history before 1860, the period in which the Library of the American

Antiquarian Society is of greatest assistance to historical investigators. In addition to the Society's valuable manuscripts of the Colonial period, it has an unequalled collection of books printed in America in the early period and of American newspapers from 1660 to 1860.

The holder of this fellowship for 1919–20 is writing his Doctor's dissertation upon "The United States and the British West Indies, 1815–1830."

COURSES

The various courses offered in the Department are so arranged, in cycles of two or three years, that students working for their doctorate will be enabled to secure a full program each year. Those taking History as a major are advised to elect their minor work in Sociology. In addition to the regular courses, a feature of the methods of instruction in the Department is the frequent informal conferences between instructor and student.

Professor Blakeslee offers the following courses:

1. UNITED STATES HISTORY. Different periods are taken for intensive study in successive years. In 1915–16 the course dealt with the period from the formation of the Constitution to the Compromise of 1850, and included the economic and social development of the country during these years as well as the history of politics. In 1916–17, it extended from the Compromise of 1850 to the close of the Civil War, with emphasis upon the years between 1850 and 1861. It treated especially the institution of slavery as it existed in the Southern States, the origin and growth of the abolition sentiment, the doctrine of states rights and the development of the antagonism between the North and the South till its culmination in the Civil War. In 1917–18, it dealt with the Colonial period up to the formation of the Federal Constitution. A critical study is made of source material, as well as of the standard authors. The introductory lectures are followed by reports presented by students upon assigned topics. *Two hours.*

2. The Expansion and the Colonial Policy of the United States. The history of the successive territorial acquisitions of the United States is traced, including the diplomatic negotiations and the relations with foreign powers. This is followed by a study of the constitutional questions involved, especially those regarding the status of newly acquired possessions and of present-day dependencies; the differences between incorporated and unincorporated territory; and the rights and privileges of inhabitants and citizens of the various lands considered. The aims and the continuity of the American Colonial policy are pointed out; and the governmental systems described for the Philippines, Hawaii, Porto Rico, Alaska, Guam, Tutuila, and the Virgin Islands. *One hour.*

3. The History of American Diplomacy. This course treats of the international relations of the United States from its beginning as an independent nation to the present day. It traces the gradual development of American foreign policy, points out its distinctive features, and shows how it has differed from the diplomacy of other countries. A familiarity with the standard books in the field is expected, and frequent reference made to such source material as Moore's Digest and Arbitrations and the Foreign Relations of the United States. *Two hours.*

4. International Law. While this course aims to give a knowledge of the general principles of International Law, it presents the subject with especial reference to the events and the outcome of the recent war, and discusses the problem of modifying the present rules of International Law to meet changed world conditions. Considerhble attention is also given to unsettled legal questions other than those of the war, such as those now pending between this country and Mexico. The lectures are supplemented by discussions and by a study of the leading text writers and of cases, especially those of historic importance; and for this purpose Scott's "Cases on International Law" and Stowell and Munro's "International Cases" are followed. A number of the significant and unsettled cases are argued by the members of the class in an imaginary Hague Court. *Three hours.*

5. The Far East. The lectures deal with Japan, with its colonies, Formosa and Korea, and its foreign policy; Manchuria and Siberia, including the history and present status of the struggle for their control; China and its recent revolutions; the Philippines and Hawaii; and the general international politics of the Far East. *One hour.*

6. British Colonies and Dependencies. A survey of the important political, economic and social conditions in the leading British possessions, especially Canada, Australia, New Zealand, India and Egypt; and a discussion of British colonial policy and problems. *One hour.*

7. Latin America. A survey of the history of the various countries is followed by a consideration of international diplomacy, political problems, systems of government, race questions, and economic and industrial conditions. Especial emphasis is placed upon the past and present relations, both in trade and diplomacy, between the United States and the countries of Latin America; this involves a careful study of the Monroe Doctrine. The lectures are based, in part, upon material which has been secured in a recent trip to South America. *Two hours.*

8. The International Relations of the Pacific. The course deals with the islands of the Pacific Ocean, especially those formerly in the possession of Germany, and emphasizes the interests of the United States. Among the topics presented are: the early period of sandalwood, beachcomber and whaleships; American trade, exploration and missionary activity; the general indifference of Europe to colonies during the first three-quarters of the nineteenth century; the gradual rise of the colonial spirit; rivalry between Germany and the Australian Commonwealths; the "scramble" for the Pacific in 1884; Germany's colonial Empire; the characteristics of Germany's colonial administration; Pacific island possessions of the United States; Japan's colonial aims and policy; naval bases and strategic centers; economic and commercial values; the world war in the Pacific; the settlement at the Paris Conference; mandatories and the future. *One hour.*

9. Historical Seminar. The students in the Department of History meet one evening a week in a seminar for the consideration of particular topics of historical interest and for the review of book and magazine material of especial value. Each member is expected to present reports which then form the basis for a general discussion.

The diplomatic and political aspects of the world settlement form the chief subject for study the present year. This includes such topics as: the provisions of the treaty of peace; the problem of reservations; Shantung; Fiume and Dalmatia; the reorganization of Central Europe and the Balkans; the proposed partition of the Turkish Empire; conditions in Russia; proposed mandatories, and the conflict with the Imperial idea; the problem of self-determination in the British Empire, especially in Ireland, Egypt and India.

In studying these problems arising out of the war the Seminar is fortunate in having at hand the excellent war collection of the University Library, the second largest in the country, which already numbers between seven and eight thousand volumes.

Courses 7, 8 and 9 are given during the present University year, 1919–20.

Mr. Jenks offers the following courses:

1. The Political and Social History of England Since 1688. A systematic study of the leading phases in the development of England in the past two centuries. Emphasis is laid upon dominant political and social ideas at different periods. The main topics considered are: the Revolution of 1688 and consequent constitutional developments; the rule of the "squirearchy;" the English background of the American Revolution; the agricultural and industrial transformation resulting from enclosures and steam power; effects of the Napoleonic wars; the Reform bill of 1832; the hightide of English Liberalism; the movement for social reform and the reaction toward imperialism and socialism; closing with an analysis of the contemporary political, social and economic position of the United Kingdom. Lectures and readings. *Two hours.*

2. The Diplomatic History of Europe Since 1815. A survey of the international relations of the chief European states from the formation of the last coalition against Napoleon to the outbreak of the World War. The Congress of Vienna; formation and failure of the Holy Alliance; the policy of George Canning in Latin America and Greece; the rise and rupture of the Anglo-French entente under the July Monarchy; the foreign policy of Palmerston; the diplomacy of Cavour and Bismarck; the Congress of Berlin; the formation and renewals of the Triple Alliance; the beginning and the development of the Triple Entente are the chief topics considered. Lectures and readings. *One hour.*

3. The History of the Intellectual Class in Europe. This course traces the changes in interests, opinions and attitudes of mind on the part of the intellectual classes from Oriental antiquity to the present day. The following are the more important topics analyzed; the antecedents of intellectual history; primitive reasoning; the general range of Greek speculation, its transmission to Western Europe by the Romans, and its assimilation with Christian doctrine, resulting in the Christian conception of man and the world as set forth in Augustine's

City of God; early medieval culture; the origin of the medieval universities, the revival of Aristotle and the range of university teaching in the thirteenth century; the slow decline of Scholasticism during the fourteenth, fifteenth and sixteenth centuries; the intellectual aspects of Humanism and the Protestant Revolt; the birth of the modern scientific spirit with Francis Bacon, Descartes and the scientists of the sixteenth and seventeenth centuries; Deism; the French Philosophes; the industrial, social and scientific revolutions of the nineteenth century and the resulting novel elements in contemporaneous intellectual life. Designed as a general cultural course and as the proper background for the more technical and specialized courses dealing with the history of science, philosophy and education. Lectures, based on Robinson's Outline of the History of the Intellectual Class in Europe, and assigned readings. *Two hours.*

4. THE EVOLUTION OF EUROPEAN CIVILIZATION. A general survey of the evolution of European society. It emphasizes the following phases of this process: the "prehistoric" background of European history; the rise and culture of the empires of antiquity; classical civilization in its economic and social aspects; northern European Culture before the fifth century A.D.; the amalgamation of Roman, Christian and "barbarian" elements in the medieval period; medieval agricultural and town life; the Crusades, the Commercial Revolution and the dawn of modern times; the rise of the modern national state system and the growth of the middle class; the Industrial Revolution and the resulting problems of political reform, social legislation, democracy and imperialism. Lectures and assigned readings, following Seignobos' History of Civilization and Marvin's Living Past as guides. *Two hours.*

5. THE EXPANSION OF EUROPE. This course aims to indicate the importance of the contact of European culture and institutions with those of the world at large for the development of European civilization in modern times. The course is organized about a study of: the Commercial Revolution and the period of the discoveries; the Europeanization of America and the early contacts with the Far East; the reaction of the processes of discovery and colonization upon European life and thought; the decline of the older Mercantilist imperialism; the Industrial Revolution and the rise of modern national imperialism; the partition of Africa and the European exploitation of Oceania and the Far East; the reaction of the contact with Africa and the Far East upon European culture and institutions. Designed to supplement course 4 and to furnish a general introduction to a more intensive study of modern imperialism and international relations. Lectures, and assigned readings, based

on Abbott's Expansion of Europe, Keller's Colonization, Muir's Expansion of Europe and the more detailed treatises dealing with special areas and topics. *Two hours.*

6. HISTORIOGRAPHY. A study of the methodology and literature of history as an introduction to historical research and as preparation for the teaching of history. After a few introductory lectures on the scope, aims, methods and interpretations of history, the course attempts to arrive at a critical knowledge of the status of contemporary historiography by studying the stages and processes through which it has been attained. Lectures, and readings in Bernheim, Langlois and Seignobos, Wolf, Bury, Peter, Gardiner, Balzani, Masson, Wegele, Fueter, Gooch, Jameson, Bassett, and in the chief works of some of the leading historians from Herodotus to Aulard and Gardiner. *Two hours.*

7. EUROPEAN SOCIAL HISTORY IN THE NINETEENTH CENTURY. This course is primarily concerned with the new social problems created by the Industrial Revolution and the theories and remedies which have been proposed in their solution. It devotes particular attention to: the factory system, the resulting dislocation of population and the rise of the urban age; economic liberalism and the abolition of legislation restricting industry and trade; utopian socialism and philosophical anarchism; the growth of proletarian agitation and unrest and the rise of trade-unionism; Marxian socialism and Catholic social reform; the emergence of the modern national state as an agent in social reform; the World War and its relation to social problems and reconstruction. Lectures and assigned readings. *Two hours.*

8. THE MODERN NATIONAL STATE. An examination of the economic, psychological and social factors in the formation and development of the national state. The present internal and external position of the leading powers will be considered. Attention will be focussed upon the commercial basis of the modern state, and an attempt will be made to assay the implications of the development of commercial organization upon its internal structure and external position. *One hour.*

Courses 1 and 2 are given during the present University year, 1919–1920.

Professor Hulbert offers the following courses:

1. PHASES OF AMERICAN EXPANSION: a lecture course, with assigned readings; designed for students desiring to specialize in American History or teach it. Special attention is paid to the geography of

American Expansion and the reaction of different soils, climates, etc., on the various racial elements; also to the development of transportation methods as expansion factors. Many of the lectures will be illustrated. Readings will be assigned from Shaler, Semple, Matthews, Winsor, Faust, Ford, Hinsdale and Turner. *Two hours.*

2. THE BACKGROUND OF THE AMERICAN CONSTITUTION: a lecture course, one semester, using McLaughlin's Confederation and Constitution as text. A study of the medley of colonial rivalries, the centripetal and centrifugal forces which were at work making for union and disunion, the documents of unification created in colonial days, leading up to the Mount Vernon conference, the Annapolis and Constitutional conventions. Special reference is made to the national influences of the western land problem and the Ordinances of 1784, 1785 and 1787. *Two hours.*

3. RELATION OF HISTORY TO THE SCIENCES. The purpose of this course is to examine the influence of geography, climatology, bacteriology, botany, hydrography, aerography, zoology, forestry, etc. in explaining the exploration and the distribution of population in the United States. Particular attention will be paid to study of agriculture and the influence of soils in the growth of great staple crops and the influence of these on development of provincial areas. *Two hours.*

Course 1 is given during the present University year, 1919–20.

LIBRARY

The Library is under the control of a Library Committee, appointed by the Trustees, of which the President of the University is *ex officio* chairman. The duties of this committee are to advise concerning the arrangement, cataloguing, use of books, and other matters pertaining to the Library not reserved to the Trustees nor otherwise provided for.

LIBRARY COMMITTEE

PRESIDENT G. STANLEY HALL, *Chairman*
PRESIDENT EDMUND C. SANFORD
PROFESSOR WILLIAM E. STORY, *Secretary*

LIBRARY STAFF

LOUIS N. WILSON, *Librarian*

ASSISTANTS

EDITH M. BAKER, *Senior Assistant*
HELEN J. ELLIOT, *Cataloguer*
HELEN RUGGLES
EDITH L. SAWYER
GRACE E. BUTTLER

The Library building is situated on the corner of Main and Downing streets. The Public Opening of the building was held January 14th, 1904. A full description of the building and of the Proceedings at the Opening will be found in the *Publications of the Clark University Library* for April, 1904 (Vol. 1, No. 3).

The College Library and study rooms occupy the lower floor of the new building, opened in September, 1910, and described in the College Record, July, 1910, Vol. 5, pp. 185–187.

The Library contains over 91,000 bound volumes and pamphlets, and the reading-room receives over 500 journals.

The books are grouped as follows:

A	Works of General Reference
B	Journals
C	Mathematics
CD	Math.-Physics
D	Physics
DE	Physical Chemistry
E	Chemistry
F	Biology, Zoölogy, Botany, Physiology, Neurology
G	Geography
H	Pathology
I	Psychology
J	Philosophy
K	Religious Psychology
L	Biography
M	Anthropology
N	Education
O	General Science
P	History
R	Political and Social Science Economics
S	English
T	Modern Languages
U	Classics
W	Practical Arts
X	Library Science
Y	Art
Z	European War

Tuesday and Friday mornings, each week, all books recently added to the library are placed upon a table in the Reference section where they remain for three days. This affords the members of the University and College an opportunity to examine the new books in all departments before they are placed upon the shelves for circulation.

About once a month, during term, by the courtesy of our booksellers, new books are placed for inspection on one of the tables in the Reference section. Any member of the University or College may recommend the purchase for the library of books thus displayed, and such recommendation will receive prompt attention.

All books are classified by the heads of departments and particular attention is paid to the needs of students engaged in research work. The library already possesses a good collection of complete sets of the best scientific periodicals. It makes liberal purchases for individual needs and supplements these by drawing upon the resources of the older and larger libraries through the inter-library loan system. During the past year 180 volumes were borrowed from, and 270 volumes lent to, other libraries. The number of books added each year is about four thousand volumes.

The publications of the Library, edited by the Librarian, and begun in October, 1903, are as follows:

VOL. 1

(1) Bibliography of the Published Writings of President G. Stanley Hall. (2) Bibliography of Child Study for the Year 1902. (3) Proceedings and Addresses at the Public Opening of the Library Building of Clark University, January 1904. (4) Bibliography of Child Study for the Year 1903. (5) Preparing Manuscript for the Press. (6) Founder's Day, Clark University. (7) Bibliography of Child Study for the Year 1904. (8) The Probable Source of the Plot of Shake-

speare's Tempest. (9) Public Opening of the Art Department of Clark University, Dec. 5, 1905.

VOL. 2

(1) List of Books and Pictures in the Clark Memorial Collection. (2) Bibliography of Child Study for the Year 1905. (3) A Few Titles in Child Study. (4) Proceedings at the First Annual Banquet of the New England Association of Alumni of Clark University, and at the Banquet of the Washington, D. C., Alumni Association, 1907. (5) Bibliography of Child Study for the Year 1906. (6) Bibliography of Child Study for the Year 1907. (7) The Outlook for Research (Founder's Day Address, February 1, 1911). (8) List of Papers in the Field of Religious Psychology Presented at Clark University. (9) List of Degrees Granted at Clark University and Clark College.

VOL. 3

(1) The Relative Legibility of Different Faces of Printing Types (2) Suggestions for a Model Private Library at Clark College. (3) Bibliographies on Experimental Pedagogy. (4) Further Suggestions for a Model Private Library at Clark College. (5) Bibliographies on Educational Psychology. (6) Representative Books in Child Study. (7) Twenty-Fifth Anniversary of Clark University, 1889–1914.

VOL. 4

(1) List of Degrees granted at Clark University and Clark College, 1889–1914. (2) Alexander Francis Chamberlain. In Memoriam. (3) Bibliographies on Educational Subjects—No. 3. (4) The Universities and Investigation. Address delivered on Founder's Day, February 1, 1915. (5) Bibliographies on Educational Subjects—No. 4. Experimental and General Pedagogy. (6) Directory of Alumni, Faculty and Students. Clark University.

VOL. 5

(1) Bibliographies on Educational Subjects—No. 5. (2) Report of the President and Departments, 1916. (3) The Future of Science in America. (4) Posters and Pictures Relating to the European War. (5) Americanism in War and in Peace. (6) Bibliographies on Educational Subjects—No. 6. (7) Suggestions for the Preparation of the M. A. Thesis.

VOL. 6

(1) The War Collection at Clark University Library. (2) John Wallace Baird—In Memoriam.

The books in the Art Department are accessible on application to the librarian, but, by the terms of the Founder's will, they cannot be taken from the building.

All the privileges of the Library are open to all members of the University, and each member has direct access to every book and journal.

The Library is open from 8 a.m. to 6 p.m. each week day from Sept. 1 to July 1. During July and August it is open from 8 a.m. to 5 p.m. from Mondays to Fridays, and on Saturdays from 8 a.m. to 12 m. The library is closed July 4th, Thanksgiving Day and Christmas Day.

Outside the University are found:

The Library of the American Antiquarian Society, organized in 1812, and containing over 125,000 volumes, accessible to all members of the University.

The Worcester Public Library, containing 600 newspapers and magazines and 200,000 volumes, has, in the past, to some extent supplemented the scientific publications purchased by the University, and all its privileges are accessible without charge.

The Library of the Worcester District Medical Society of about 12,000 volumes, is also free to all members of the University.

LIBRARY RULES

No loud talking is allowed in any part of the Library.

Every book shall be returned at the end of one calendar month from the time at which it was taken out, but may be called in at any time at the discretion of the Librarian.

Current numbers of periodicals shall not be taken out until they have been in the Library ten days.

All dictionaries, cyclopædias, and books of general reference are permanently reserved.

Reserved books and current numbers of periodicals, exempt from circulation, may be taken out after 5 p.m., but must be returned before 9 o'clock the next morning, excepting that such books and periodicals may be taken out Saturdays at 12 o'clock, and may be kept until 9 o'clock the next Monday morning.

Readers must nor write nor make any mark upon any book, manuscript, map, or other property belonging to the Library.

Any breach of the above Rules will involve suspension of the Library privileges until personally restored by the Librarian. All such cases shall be laid before the Library Committee at their next meeting.

ART DEPARTMENT

In his last will and testament the Founder of the University bequeathed

"the sum of $100,000, as an endowment fund for the Art Department of said University, and said sum is to be held and kept sacred and intact as a principal not to be used or expended under any conditions; but the income, interest or proceeds thereof shall be used only in putting and keeping said works of art or others given or obtained for said department in good condition and in taking care of them; and then if there is a surplus of the income of said fund left, I will and direct that it be used in the purchase of additional works of art or of such matters as will add to the usefulness and efficiency of said Art Department."

Under these conditions a large room has been furnished and equipped on the upper floor of the Library Building. Upon the death of Mrs. Clark, those of the Founder's collections that were deemed most suitable for this purpose were arranged and displayed in this room, together with his most valuable books, which, by the conditions of the will, cannot be removed from the building. A complete catalogue of these books and paintings has been published in the PUBLICATIONS OF THE LIBRARY, Vol. 2, No. 1.

A Curator and Custodian have been appointed by the Board (see page 114) and all the collections are now accessible to visitors. The Art Department is open daily (except Sundays) from 9 a.m. to 5 p.m.

Three portraits and one landscape painting have been added to the collection:

1909. Portrait of the late Carroll D. Wright, President of the Collegiate Department from 1902 to 1909, by the late Frederick P. Vinton of Boston. This painting was awarded the Temple Gold Medal at the 1909 Exhibition of the Pennsylvania Academy of Fine Arts.

1911. Portrait of G. Stanley Hall, President of Clark University, by the late Frederick P. Vinton of Boston.

1913. Landscape painting "Snowing," by Joseph H. Greenwood of Worcester.

1914. Portrait of Edmund C. Sanford, President of Clark College since 1909, by Joseph De Camp.

To commemorate the twenty-fifth anniversary of the University the Board of Trustees, early in 1914, commissioned Mr. Victor D. Brenner of New York to prepare a medal to mark that event. The medal is made of bronze and is three inches in diameter. On the obverse is delineated the head of President Hall, and on the reverse a beautiful allegorical group symbolizing the spirit of the University, and the legend,

> "Knowledge is proud that he has learned so much,
> Wisdom is humble that he knows no more."

Scale models of the buildings and the University grounds have been made by T. J. McAuliffe and Son of Worcester, under the direction of the architects, Messrs. Frost and Chamberlain.

During the past year more pictures, cartoons and posters relating to the European War have been purchased. The collection now numbers nearly 10,000 items.

REGULATIONS

1. All requisitions for apparatus must be made through the Bursar's office upon printed blanks provided for that purpose and signed by a member of the staff.

2. So far as possible, orders for only the kind and amount of apparatus certain to be used during the year shall be placed; nothing shall be ordered for future years, and apparatus for research shall take precedence over that for teaching and illustration only.

3. Requisitions for repairs, furniture, plumbing and work about the buildings must be made through the Bursar's office in writing and with detail, and, when once passed upon, no change involving additional expense can be made in the requisition without the consent of the Finance Committee.

4. No unappropriated rooms and no part of the University grounds shall be used for any purpose, and appropriated rooms shall not be used for other purposes than the stated University work for which they were intended, without previous permission from the office.

5. Unless for special reasons, absence of instructors from their stated exercises or from town for two consecutive week days in term time should be announced at the office, and for longer absence permission should be obtained beforehand.

6. The Trustees desire that no Instructor, Docent, or

Fellow shall enter upon other engagements outside his proper work in the University of a kind or amount likely to lessen his full efficiency for science within the University.

7. Appropriations shall hereafter cover all apparatus and supplies of whatever nature for laboratories, for demonstration or illustration; all metal and carpenter work connected with the scientific activity of each department; and every form of special service. Appropriations, however, shall not hereafter cover orders for books or journals, which shall be submitted to the Library committee.

8. The several appropriations made to individual instructors and others shall be the full and fixed limit of the liability of the University, to be on no account transcended; and for every excess over the appropriations, from whatever cause, the instructor making the order shall be personally responsible.

9. No order for any purpose shall be paid by the University, whether on appropriations or for general supplies, that has not passed through the Bursar's office.

10. The President, Professors, Assistant Professors and regular Instructors authorized by the Board to do graduate work, together with the Librarian, shall constitute the Faculty of the University. Its meetings shall be called and presided over by its President, or, in his absence, by a Professor whom he shall designate. The Faculty shall elect a Secretary and its records shall always be accessible to the Trustees. Its jurisdiction shall include all matters pertaining to the instruction, conduct and discipline of students, and such other duties as may be prescribed by the Trustees.

11. The President of the University shall make, at the October meeting of the Board, an annual report on the condition of the departments and their work during the year and shall have authority to require and receive from all Instructors and Officers of the University and Library such reports as he may deem necessary. A copy of these reports, including that of the Library, shall be deposited with the Mayor of the City.

12. The University Faculty shall have the oversight of all graduate work and shall recommend for the Master's, Doctor's and all other graduate degrees upon such terms, conditions, and forms as it may determine, and exercise such other functions and responsibilities as are not expressly assigned to the Trustees or to the Collegiate Department.

13. The Custodian of the Art Collection shall have general oversight over its room in the Library Building and its contents, together with their care and use, under the direction and control of the Curator. The Curator shall from time to time submit to the Trustees his recommendations for the purchase of additional works of art from the income of the Art Fund, based on and together with the opinions of experts as to their value and desirability. All such purchases shall be approved by the Board of Trustees, or by such a committee of their members as they shall appoint for that purpose.

14. The President of the University shall make an annual report to the Trustees of the action of the Library Committee, of which he is Chairman, and this report, if approved, shall be filed and preserved.

DEGREES CONFERRED

On June 23, 1919, the University conferred degrees on the following persons:

MASTER OF ARTS

WILBUR COMMODORE BATCHELOR
  Thesis: Some Aspects of Physical Education in Relation to the War
IDA LOUISE BULLARD
  Thesis: A Report on the Literature of Fractional Differentiation
MAURICE E. J. PIETERS
  Thesis: Some Aspects of the Renaissance of the French Religious Spirit
LAURA GERTRUDE SMITH
  Thesis: Psychological Aspects of Certain Religious Sects

DOCTOR OF PHILOSOPHY

PHYLLIS MARY BLANCHARD
  Dissertation: A Psychoanalytic Study of the Adolescent Girl
PING LING
  Dissertation: Public Schools and the War
MARY DOWNEY REBBOLI
  Dissertation: A History of the American Attitude towards Expansion.
WINIFRED V. RICHMOND
  Dissertation: The Adolescent Girl: A Clinical Study
JESSE WILLIAM SPROWLS
  Dissertation: War and Education
AXEL JOHAN UPPVALL
  Dissertation: August Strindberg: A Psychoanalytic Study
ALBERT PERLEA VAN DUSEN
  Dissertation: The Socialization of the Protestant Churches

PUBLICATIONS

A Register and Official Announcement is issued each year in January or February.

In the years 1890, 1891, 1893, 1902 and 1916, the annual Report of the President to the Board of Trustees was printed.

A Summer School was held for nine years ending in 1903, and in such years a Summer School Programme was issued.

In July, 1899, the University observed its tenth anniversary, and published the following volume:

Clark University, 1889–1899. Decennial Celebration. 8 x 11 in., pp. 566. Published for the University. Price, $5.00. Contains the lectures delivered by Professors Picard, Boltzmann, Ramon y Cajal, Mosso and Forel at the Decennial Celebration, July, 1899; also reports by the heads of departments on their aims and ideals, with a list of past and present members of the University and the titles of their published papers.

PROCEEDINGS OF THE CHILD CONFERENCE FOR RESEARCH AND WELFARE. Conferences held at Clark University in the summers of 1909 and 1910. Vol. 1, 1909, 257 p., contains 48 papers on problems relating to child welfare. Vol. 2, 1910, 287 p., contains 34 papers, on similar subjects. The papers in Vol. 1 were reprinted from the Pedagogical Seminary for September and December 1909, but those in Vol.

2, with one exception, have not been printed elsewhere. Price $2.00 per volume in paper, $2.50 in cloth. Louis N. Wilson, Publisher, Worcester, Mass.

In connection with the celebration of the 20th anniversary of Clark University in September, 1909, conferences and lectures were held by the several departments to which distinguished scientists and educators in this and other countries contributed. Two volumes of these lectures have been published with the titles:

Lectures and Addresses Delivered before the Departments of Psychology and Pedagogy in Celebration of the 20th Anniversary of the Opening of Clark University. 175+80 pages. Price, $2.00.

Lectures Delivered at the Celebration of the Twentieth Anniversary of the Foundation of Clark University under the Auspices of the Department of Physics. 161 pages. Price, $2.00.

Chemical Addresses delivered at the Second Decennial Celebration of Clark University, in September, 1909. 192 pages. Price $2.00.

Japan and Japanese-American Relations, pp. xi, 348, New York: G. E. Stechert and Company, 1912, $2.50. Edited by Professor George H. Blakeslee. The volume contains twenty-two of the addresses delivered by the experts, both Japanese and American, who met at the Clark University Historical Conference, November, 1911. Each of the chapters deals with a distinct topic; together they cover progressively the field of what is both most interesting and most vital in the present national and international situation of Japan.

Recent Developments in China, pp. xi, 413, New York: G. E. Stechert and Company, 1913, $2.50. Edited by Professor George H. Blakeslee. These twenty-two addresses, given at the Clark University Conference, November, 1912, by Chinese and Americans who have a recent, intimate and authoritative knowledge of China, present the underlying causes of the Revolution, and the progress and problems of the Chinese people in government, education, social welfare, industry and religion.

LATIN AMERICA, pp. xii, 388, New York: G. E. Stechert and Company, 1914, $2.50. Edited by Prof. George H. Blakeslee. Twenty-nine addresses given at the Clark University Conference, November, 1913.

These addresses, by well-known authorities upon Latin-American affairs, including a large proportion of citizens of Latin-American countries, present a critical study of the salient features of the life of the American Republics to the south of us, and of their relations to the United States. Among the topics especially emphasized are, the Monroe Doctrine, the Mexican Situation, Trade and Business Relations, Diplomatic Relations, and Education.

PROBLEMS AND LESSONS OF THE WAR. Clark University Addresses. Edited by Professor George H. Blakeslee. Foreword by President G. Stanley Hall. New York and London, G. P. Putnam's Sons, 1916, 424 pps. $2.00.

This volume contains side by side the opposing views on the fundamental issues of the war as presented by twenty-four writers of wide reputation. Three British subjects, one a member of Parliament, and three American citizens of German descent and sympathy—all university professors—are among the contributors. Some of the subjects discussed are: The Effect of the War Upon Europe, The German Theory of State, The German Theory of Militarism, What a German Victory Would Mean, The Effect of the War Upon Pan-American Coöperation, The Economic Position of the United States at the Close of the War, Naval Lessons to the United States in the War, The Maintenance of Our National Obligations, The Extension of the Monroe Doctrine, Economic Aspects of the War, Nationalism and War, The Red Cross Work, and Preparedness. President G. Stanley Hall discusses, in his foreword, The Psychology of the Present War.

JOURNALS CONNECTED UNOFFICIALLY WITH THE DEPARTMENTS

THE AMERICAN JOURNAL OF PSYCHOLOGY. This journal was commenced in November, 1887, and is now edited by G. Stanley Hall, E. C. Sanford, E. B. Titchener (Cornell University), with the assistance of an international board of coöperators. Each volume contains four numbers—issued in January, April, July and October. Besides original articles, a considerable portion of its space is devoted to careful digests of the important literature in its field. Price, $5.00 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

THE PEDAGOGICAL SEMINARY. This journal was begun in January, 1891, and is edited by the President of the University with the assistance of William H. Burnham, Professor of Pedagogy. It is an international record of educational literature, institutions and progress, and is devoted solely to the highest interest of education in all grades. with digests of important literature of all countries. It is the organ of the Educational Department of the University. Each volume contains four numbers—issued in March, June, September and December. Price, $5.00 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

THE JOURNAL OF INTERNATIONAL RELATIONS. This publication was begun in July, 1910, as The Journal of

Race Development, and continued under that title until 1919. It is edited by Dr. Blakeslee and President Hall with the coöperation of a board of twenty-four contributing editors. It offers itself as a forum for the discussion of international problems; and aims to present the essential facts in the most important international issues, as well as critical reviews of the new volumes in its field. Issued quarterly, each number containing about 125 pages. Price, $3.00 per volume; 75 cts. per number. Louis N. Wilson, Publisher, Worcester, Mass.

JOURNAL OF APPLIED PSYCHOLOGY. This journal will appear quarterly, beginning March, 1917. It is edited by President G. Stanley Hall and Dr. L. R. Geissler, with the coöperation of twenty contributing editors. It aims to be a medium for original investigations on the practical problems of psychology, and to digest the literature in its field through book reviews and summaries of articles appearing in other periodicals. Each volume of four issues will contain about 400 pages. Price, $4.00 per volume; single copies, $1.25. Florence Chandler, Publisher, Worcester, Mass.

UNIVERSITY COLORS

EMERALD GREEN AND WHITE

To be worn in the hood as a green chevron
on a white field

The Waverly Press
WILLIAMS & WILKINS COMPANY
BALTIMORE, U. S. A.